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UNIVERSITY OF ALBERTA

SYSTEMATICS OF THE PHILIPPINE THYSANOPTERA

BY

CECILIA P. REYES

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND
RESEARCH IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF ENTOMOLOGY

EDMONTON, ALBERTA
Fall 1990

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ABSTRACT

About 10,000 thrips specimens collected from various islands of the Philippines or deposited in certain museums were examined in this project. A total of 195 species in 2 suborders (Terebrantia and Tubulifera) and 3 families: Aeolothripidae (new record), Thripidae and Phlaeothripidae are recorded. Nine genera are recognized as new to science: *Hemingia*, *Filipinothrips*, *Amphidoxothrips*, *Gemmathrips*, *Praeciputhrips*, *Proaliothrips*, *Prosolomonthrips*, *Psephenothrips*, and *Rosingothrips*.

Terebrantia include 87 species placed in 43 genera; of which 45 were previously recorded, 23 are first records for the archipelago and 19 are new to science: *Franklinothrips rarosae*, *Streothrips alaris*, *Helionothrips guttatus*, *Hemingia glandula*, *Panchaetothrips stepheni*, *Ceratothrips reticulatus*, *Dendrothripoides nakaharai*, *Dendrothrips virgulatus*, *Filipinothrips baltazarae*, *Javathrips ciliaris*, *Javathrips variegatus*, *Neohydatothrips calilungae*, *Pseudodendrothrips maculosus*, *Stenchaetothrips denticulatus*, *Stenchaetothrips spinalis*, *Thrips palmerae*, *Trichromothrips bruncurrum*, *Tusothrips atrichotus* and *Tusothrips immaculatus*.

Tubulifera include 108 species placed in 46 genera; of which 55 were previously recorded, 26 are first records for the Philippines and 25 are new to science: *Compsothrips furvus*, *Adelphothrips longisetosus*, *Amphidoxothrips armatus*, *Apelaunothrips makilingae*, *Dolichothrips crassusensus*, *Gemmathrips brevis*, *Gynaikothrips capitulatus*, *Gynaikothrips pedanus*, *Gynaikothrips pontis*, *Gynaikothrips xynos*, *Hoplandrothrips apoi*, *Karnyothrips ateuchis*, *Karnyothrips expandosus*, *Leeuwenia arbastoae*, *Liothrips capitonis*, *Liothrips helvutibia*, *Liothrips leptum*, *Mesothrips ignotus*, *Podothrips dichromatus*, *Praeciputhrips balli*, *Praepodothrips causiapeltus*, *Proaliothrips moundi*, *Prosolomonthrips mindori*, *Psephenothrips strasseni*, and *Rosingothrips ommatus*.

The generic name *Gigantothrips* Zimmermann is synonymized with *Gynaikothrips* Zimmermann; *Gigantothrips elegans* Zimmermann is transferred to *Gynaikothrips* while the name *Thrips armatus* Moulton is synonymized with *Fulmekiola serrata* (Kobus). The species are keyed, diagnosed and described, with figures provided for all new species. World distribution and known hosts are provided for each species except for those of cosmopolitan distribution.

The known thrips faunas of the Philippines, India, Taiwan, Japan, Thailand, Malaysia, Indonesia, New Guinea and Australia were analyzed at the generic level using Jaccard's Coefficient. The analysis shows that the Philippines does not constitute a single zoogeographic unit. The Palawan fauna is distinctly Malaysian in affinity. Luzon has more continental asian elements while Visayas and Mindanao are faunistically allied. The percentage of endemism in the Philippines is higher (52.8%) in tubuliferans than in terebrantians (26.4%).

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1. INTRODUCTION

Thysanoptera comprise an order of minute insects of considerable scientific and economic importance. Their habitats range from forests, and grasslands, to gardens, and crops. Members of many species are fungivorous, phytophagous, or carnivorous or are gall makers or inquilines, and some are vectors of viral and bacterial diseases of plants, or are pollinators of flowers. They themselves are preyed upon by other arthropods and by various vertebrates. In spite of their small size (adults are 0.5-14 mm long), generally drab coloration and obscure habits, they possess remarkable structural peculiarities, such as fringed wings, asymmetric "punch and suck" mouthparts (in which the left mandible only is developed), a protrusible sac-like arolium at the end of each tarsus, and propupal and pupal instars in their life histories (Heming, 1971, 1978, In Press). These unique characteristics of thrips have warranted their being recognized as constituting a separate order of insects.

Since the time of Haliday (1836), two suborders have been recognized: the Terebrantia (adult females of which have an external ovipositor of four, saw-like valves; forewings with veins, setae, socketed wing cilia and microtrichia; and maxillary stylets confined within the mouthcone) and Tubulifera (adult females of which have an internal, flexible, eversible ovipositor; wings lacking veins, setae, and microtrichia, and with unsocketed wing cilia; maxillary stylets usually retracted into the head capsule; and tenth abdominal segment tube-like). Based on his study of 37 characters, Bhatti (1988) elevated these two suborders to order level .

The Terebrantia are classified into several families, but the precise number recognized varies with different workers. Priesner (1949, 1961, 1964) recognized 4 families (Aeolothripidae, Merothripidae, Heterothripidae and Thripidae) and his scheme was adopted by workers such as Stannard (1968).

Others such as Jacot-Guillarmod (1970, 1971, 1974, 1975) in his Catalogue of the Thysanoptera of the World, divided the Terebrantia into 8 families (3 represented only by fossils). Mound, Heming and Palmer (1980) recognized 7 families: the Aeolothripidae, Merothripidae, Thripidae and Uzelothripidae and three additional families formerly classified with Heterothripidae: Heterothripidae, Adiheterothripidae, and Fauriellidae. They made this conclusion after analyzing phylogenetic relationships of recent Thysanoptera based on study of 35 imaginal characters. Bhatti (1986,1988) also recognized 7 families with slight modification from those recognized by Mound, Heming, and Palmer (1980). He proposed the name Stenurothripidae for Adiheterothripidae and Hemithripidae for Fauriellidae. I am adopting the classification system of Mound, Heming and Palmer (1980) in this study.

For Tubulifera, most workers except Dyadechko (1977) and Bhatti (1988) recognized the Phlaeothripidae as the sole family of this suborder. The number of subfamilies recognized, however, has varied with different workers. Priesner (1949,1961) recognized 3 subfamilies: the Phlaeothripinae, Megathripinae and Urothripinae which Ananthakrishnan (1969) adopted. Stannard (1957,1968), Mound (1974a), Palmer and Mound (1978), Jacot-Guillarmod (1978, 1979), Mound and Palmer (1983), Mound and Walker (1986) and Mound and Houston (1987) recognized 2 subfamilies: the Phlaeothripinae and Idolothripinae (Megathripinae as recognized by Stannard (1957)).

Urothripinae was treated as the *Amphibolothrips* phyletic line of Phlaeothripinae by Stannard(1957) and as the tribe Urothripini by Mound (1972a).

Presently, the tribal classification of Phlaeothripinae is unsatisfactory, although 3 schemes are available. Priesner (1961) recognized 10 tribes; Stannard (1957) 9 phyletic lines to which he did not formally accord tribal status and Mound and Palmer (1983), 10 tribes based on suprageneric relationships derived partly from the observations of Stannard (1957). These are: Plectrothripini, Haplothripini, Phlaeothripini, Hoplothripini, Glyptothripini, Hyidiothripini, Leeuweniini, Urothripini, Docessissophothripini, and Apelaunothripini.

For the subfamily Idolothripinae, Jacot-Guillarmod (1978) recognized 6 tribes: Idolothripini, Cryptothripini, Compsothripini, Emprosthiothripini, Pygidiothripini and Pygothripini. Mound and Palmer (1983) recognized only 2 tribes for this subfamily: Pygothripini and Idolothripini. For both subfamilies, I am adopting the classification scheme of Mound and Palmer (1983) since their work was based on consideration of a range of previously unobserved characters that seem to delimit evolutionary relationships more effectively than do other schemes.

The phylogeny of the families of Thysanoptera is incompletely resolved because of paucity of workers, with many areas in the world remaining uncollected. Despite these limitations, several evolutionary scenarios have been reconstructed for Thysanoptera. Stannard (1957, 1968) supported Grinfel'd's (1959) hypothesis that the origin of Thysanoptera may have correlated with selection of the left mandible (with a corresponding reduction of the right) as an instrument for piercing pollen grains . Stannard considered Terebrantia as more primitive than Tubulifera (Fig.1) and the Aeolothripidae as the most primitive family. Aeolothripids were considered to have characters similar to those of Psocoptera such as broad wings, with several longitudinal and cross veins; 3-segmented maxillary palpi and 9-segmented antennae with linear sensoria. Mound, Heming and Palmer (1980) suggested two alternatives (Fig. 2A, B) because they could not agree on placement of the Phlaeothripidae. According to them, the earliest Thysanoptera probably fed on detritus or fungus in leaf litter. Members of the family Merothripidae, which live in leaf litter, are regarded as the most plesiotypic of extant

Fig. 1. Phylogeny of the families and subfamilies of Thysanoptera as proposed by Stannard (1968).

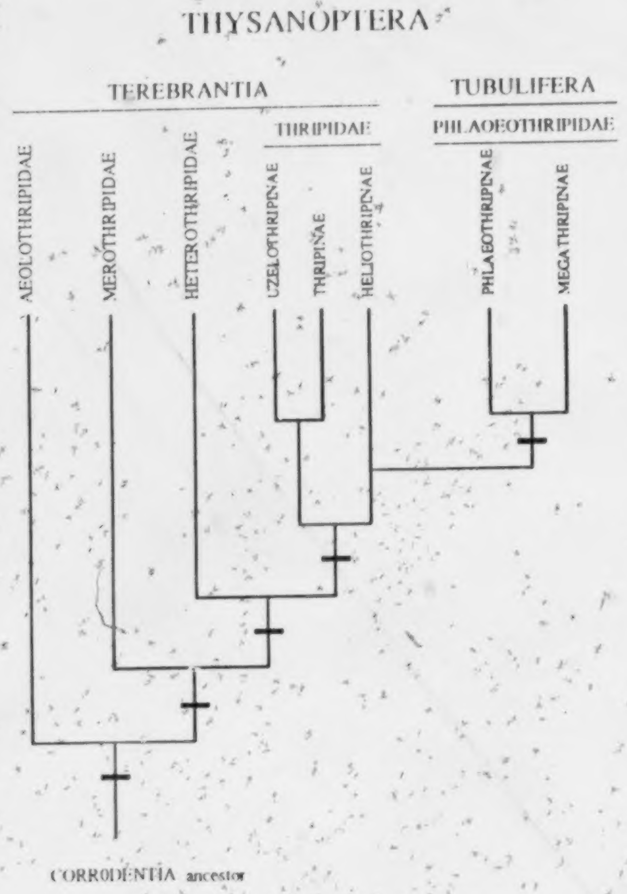
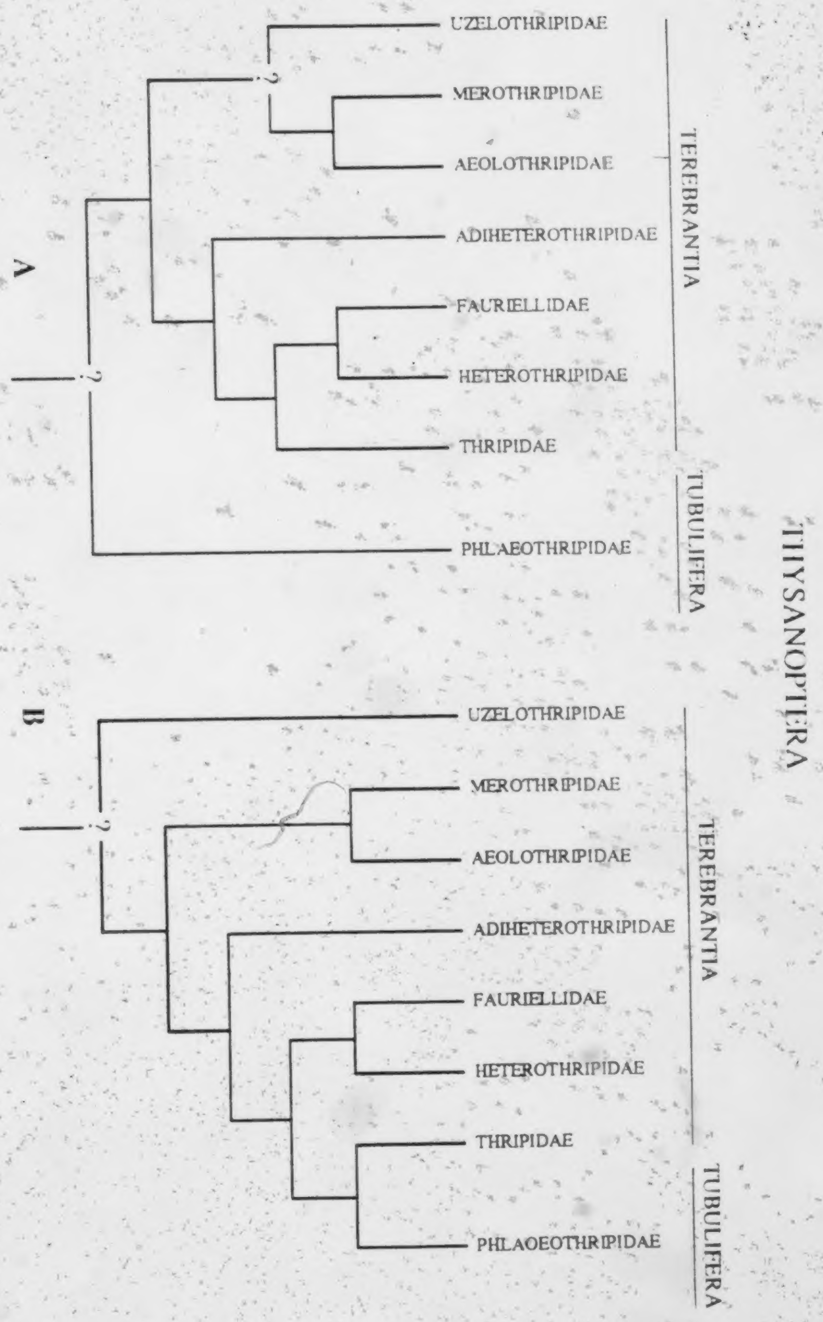

THYSANOPTERA
TEREBRANTIA
TUBULIFERA
THRIPIDAE
PHLAOEOTHRIPIDAE
AEOLOTHRIPIDAE
MEROTHRIPIDAE
HETEROTHRIPIDAE
UZELOTHRIPINAE
THRIPINAE
HELIOTHRIPINAE
PHLAEOTHRIPINAE
MEGATHRIPINAE
CORRODENTIA ancestor

Fig. 2. Two alternate phylogenies of the families of Thysanoptera as proposed by Mound, Heming and Palmer (1980).


A
?
?
UZELOTHRIPIDAE
MEROTHRIPIDAE
AEOLOTHRIPIDAE
ADIHETEROTHRIPIDAE
FAURIELLIDAE
HETEROTHRIPIDAE
THRIPIDAE
PHLAEOTHRIPIDAE
TEREBRANTIA
TUBULIFERA
THYSANOPTERA
B
?
UZELOTHRIPIDAE
MEROTHRIPIDAE
AEOLOTHRIPIDAE
ADIHETEROTHRIPIDAE
FAURIELLIDAE
HETEROTHRIPIDAE
THRIPIDAE
PHLAOEOTHRIPIDAE
TEREBRANTIA
TUBULIFERA

thrips. Merothripids merited such status due to their generally fully developed tentorium, relatively unspecialized mouthparts, well developed sternite in abdominal segment VIII, and weakly developed ovipositor. Tubulifera and Terebrantia constitute equivalent suborders in scheme A but in B, Tubulifera is merely one of 4 subfamilies in the family Thripidae. Evidence presented since by Bode (1988), Bhatti (1988) and Moritz (1989d) provide additional support for scheme A. In this work, classification of Thysanoptera into 2 suborders - Terebrantia and Tubulifera - is adopted for stability and practicality.

The world fauna of Thysanoptera is presently known to consist of about 4,700 species with 2,000 terebrantians and 2,700 tubuliferans (Mound and Walker, 1986). In the Philippines, of the 102 species of thrips recorded up to the time of this study, 45 belong to the suborder Terebrantia and 57 to the Tubulifera. Only the family Thripidae of the Suborder Terebrantia is represented in the Philippines. This family is known to contain many species whose members are injurious to crops with several of these having a wide range of hosts. The 2 subfamilies of Thripidae: Panchaetothripinae and Thripinae, are presently represented by 9 and 36 species respectively. In Tubulifera, the two subfamilies of Phlaeothripidae are presently represented by 47 species in Phlaeothripinae and 10 in Idolothripinae. Phlaeothripids are known to live in a wide range of habitats including moss, fungi, litter, the bark of dead or living trees and grasses, with members of some species causing leaf galls, and of a few others being predatory on other small arthropods.

1.1 KNOWLEDGE OF THE THYSANOPTERA OF THE PHILIPPINES

The first report of thrips in the Philippines was by Banks in 1904 who observed an unknown, black thrips injuring cacao plants. Based on Banks' illustration, Russell (1912) identified this thrips as *Mesothrips ficorum* (Marchal) now transferred to *Gynaikothrips* (generic transfer by Karny in 1912a), a species which causes injury to various species of *Ficus*. Given the difficulty of identifying tropical, leaf feeding tubuliferans and the fact that neither Russell nor I was able to locate this specimen from different U. S. museums, I hesitate to accept Russell's determination.

Ashmead (1905) described *Ecacanthothrips tibialis*, the earliest known tubuliferan species while Morgan (1913) described the earliest known terebrantian, *Rhipiphorothrips pulchellus*, from leaves of "banyan" tree. Six years later, Uichanco (1919), in his study of plant galls of Philippine plants, reported 7 leaf-gall forming tubuliferans (of which 3 were unidentified). Other early workers who contributed to our present knowledge of Philippine thrips were Hood (1919a), Karny (1920a), Moulton (1927, 1935, 1936, 1947), Priesner (1929a, 1930a, 1939a, 1940) and Sakimura (1955). Most notable of these contributions were the works of Moulton, mostly on Terebrantia, and those of Priesner on Tubulifera. Many terebrantians were discovered and described during this period due to the practice of sending specimens to foreign specialists in the United States and Europe for identification, and from those found on plants that were taken by quarantine officials at U.S. ports of entry (Honolulu, Los Angeles, San Francisco, Seattle, and New York). Filipinos and Americans were entering and leaving the Philippines more frequently at that period when the islands were under American occupation. Moreover, C. F. Baker's collections, willed to the U.S. National Museum after he died in 1927 (Gapud,1980), became the basis for many publications on Philippine insects including a few thrips.

Interest in Philippine thrips was rekindled with the appearance of the contributions of Calora and Ferino (1968), Priesner (1968), Sakimura (1974), Calilung (1977), Kudo (1977, 1978, 1980), Okajima (1979a, 1982, 1983a, 1983b, 1984, 1987a, 1987b, 1988), Bhatti (1980a), Mound and Palmer (1983), Nugaliyadde and Heinrichs (1984), Nakahara (1985) and Bournier (1987). Most new records of Philippine tubuliferans at this time were contributed by Okajima. He collected and described specimens from Mt. Apo, Mindanao and from Bicol and Quezon National Parks in Luzon. I. Kudo, another Japanese worker, collected and reported on a few panchaetothripines from the Manila and Laguna areas.

Other publications which list or mention known Philippine thrips are those of Capco (1957), Baltazar (1966, 1968), Jacot-Guillarmod (1971, 1974, 1975, 1978, 1979), Arnaud and Lee (1973), Ananthakrishnan (1973, 1982), zur Strassen (1973, 1979, 1980a, 1983, 1984), Mound (1974b, 1976a), Wilson (1975), Pitkin (1976, 1977), Bhatti (1978a, b, 1980b, c), Palmer and Mound (1978), Mound and Walker (1986), Jacot-Guillarmod and Brothers (1986) and Mound and Houston (1987).

As indicated in the above summary, thrips have, hitherto, been considered in the Philippines principally in relation to their actual or potential agricultural importance and no serious attempts have been made to survey the fauna thoroughly throughout the archipelago using a variety of collecting techniques in a variety of habitats. It seemed to me, that a contribution that might have the most value at this point in time, both to Filipinos and to other thysanopterists, would be a faunistic study. Revisions of higher taxa and studies of phylogeny, of intraspecific variation, and of the ecology and behavior of single species, would seem to me to be more useful if implemented against a background of knowledge of the thrips fauna of the islands. In addition, availability of a faunal analysis complete with keys, descriptions, distributional data and hosts would assist subsequent workers in choosing problems for further study.

My objectives in this work are: 1), to make a first attempt at recording the diversity of Philippine species; 2), to report new records and to describe new species; 3) to prepare a key to the Philippine thrips; and 4), to analyse the zoogeography of the fauna and that of some neighboring countries.

2. MATERIALS AND METHODS

2.1 MATERIALS

This study is based on examination of approximately 10,000 specimens of adult thrips. About 1,000 of these were either borrowed from or examined in 13 different institutions and 9,000 from my personal collection. Codens given here are used throughout the text to indicate deposition of specimens. Names of the curators and entomologists who assisted me are provided in parentheses.

BESP	Bicol Experiment Station, Pili, Camarines Sur, Philippines (A. P. Mutya)
BPBM	Bernice P. Bishop Museum, Honolulu, Hawaii, U.S. A. (F. Bianchi and S. Swift)
CASC	California Academy of Sciences, San Francisco, California, U. S. A. (W. J. Pulawski and V. F. Lee)
CPRC	Personal collection of Cecilia P. Reyes
DESB	Davao Experiment Station, Bago-Oshiro, Davao City, Philippines (F.B. Pableo)
IRRI	International Rice Research Institute Entomological Collection, College, Laguna, Philippines (A. Barrion)
LARC	La Granja Agricultural Research Center, La Granja, La Carlota, Negros Occidental, Philippines (M. Alba)

MNHB	Museum fur Naturkunde der Humboldt, Berlin, Deutsche Demokratische Republik (J. Deckert)
SMFD	Forschungsinstitut Natur Museum Senckenberg, Frankfurt am Main, Bundesrepublik Deutschland (R. zur Strassen)
TMNH	The Museum of Natural History, London, England, U.K. (L.A. Mound and J. M. Palmer)
UPLB	University of the Philippines at Los Banos Museum of Natural History, College, Laguna, Philippines (V.J. Calilung and C.R. Baltazar)
USCC	University of San Carlos, Cebu City, Philippines (F. E. Edillo)
USNM	National Museum of Natural History (formerly United States National Museum) Smithsonian Institution, Washington, D.C. , U S. A. (S. Nakahara)
VISCA	Visayas College of Agriculture Entomological Collection, Baybay, Leyte, Philippines (L. C. Raros)

2.2. METHODS

2.2.1 COLLECTION, PREPARATION AND CURATION

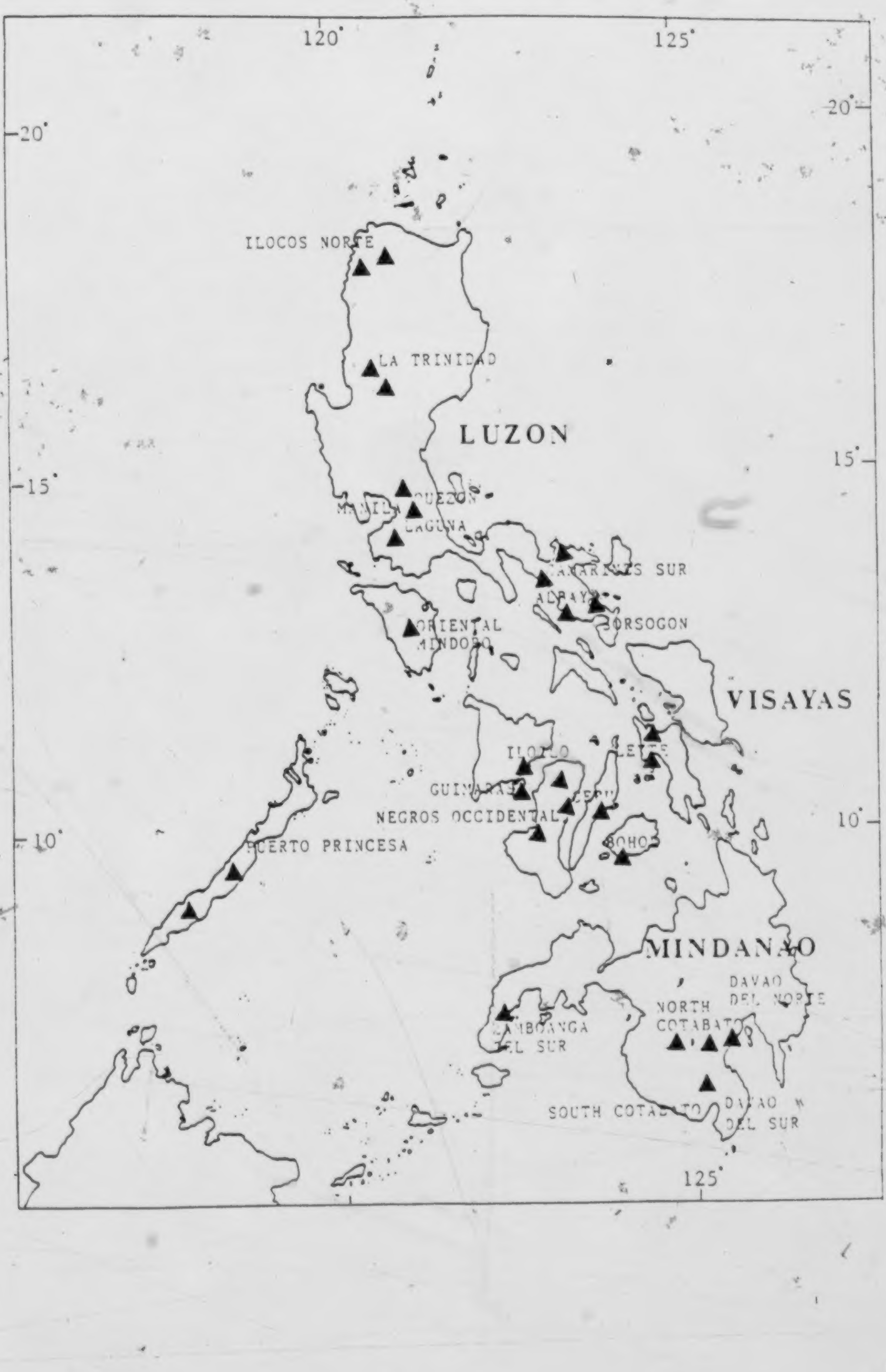
Thrips were collected from various localities in 18 provinces of Luzon, Mindanao and Visayas (Fig.3). Due to the unpredictable, "peace and order" situation of the countryside, many undisturbed areas in the country remain uncollected. A combination of beating foliage or inflorescences and handpicking or brushing of thrips were the principal methods of collecting but Berlese funnels, Malaise traps, sweep nets and a D-VAC suction machine were also used in some instances. A yellow cloth beating sheet provided good contrast to the brownish and blackish color of most thrips.

Specimens were placed in 5 ml plastic vials containing A.G.A. (60% ethanol, glycerol and acetic acid in the ratio of 10:1:1) and, in some instances, into vials containing 60% ethanol only. Labels provided in each vial included information on locality, altitude (when available), date, and host plants. A denim shoulder bag with pockets made to fit the size of each vial served as a safe, handy carrier while in the field.

Thrips were prepared for microscopical study using the techniques of Mound and Pitkin (1972). A.G.A.- preserved specimens were transferred to watch glasses (65 mm) containing 60% ethanol and stored for at least 24 hours. This was replaced by pipette with 50% ethanol for 30 minutes before specimens were macerated in 5% cold NaOH. The time required for maceration varied and was difficult to estimate. To obtain satisfactory results, trial and error experiments were done with representatives of common species. Specimens were washed in distilled water, passed through a graded series of ethanol concentrations

Fig. 3. Map of the Philippine Islands showing areas collected.

▲ collecting sites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CAMARINES SUR
ALBAY
SORSOGON
ORIENTAL
MINDORO
VISAYAS
ILOILO
LEYTE
GUIMARAS
CEBU
NEGROS OCCIDENTAL
BOHOL
PUERTO PRINCESA
MINDANAO
DAVAO
DEL NORTE
NORTH
COTABATO
ZAMBOANGA
DEL SUR
SOUTH COTABATO
DAVAO
DEL SUR

starting at 50% and ending at 98%, and cleared in Cedar wood oil prior to mounting in Canada balsam. Although wings, legs, and antennae should be spread at each stage, spreading the appendages when they were in 60% ethanol after maceration, seemed to give satisfactory results. Thoracic and abdominal membranes were punctured with a very fine needle which helped in clearing and dehydration.

Each thrips was mounted dorsum uppermost on a microscope slide under a 13 mm coverslip with the head toward the preparator. Slides were labelled with the following information: right label - country, locality, altitude, date, host plant and collector; left label - identity, sex, date of determination and name of identifier. Slides were dried for at least 3 weeks on a hot plate maintained at 40°C and were stored permanently in the dark in slide boxes to protect specimens from dust and low humidity, and to prevent fading of specimens. Unmounted specimens were stored in 60% ethanol in 5 ml. vials.

2.2.2 DIAGNOSTIC CHARACTERS

The following notes are intended as a guide to the structural features referred to in the keys and descriptions given below. Many aspects of thrips structure and function are well understood and notable contributions are those of Heming (1970a, b, 1971, 1972, 1973, 1975, 1978, 1980), Moritz (1982a, b, c, 1988, 1989a, b, c, d) and Bhatti (1988).

Important structural features of adult terebrantians are illustrated and labelled in Fig. 4, of the four immature stages in Fig. 5a,b, c, d and lateral pterothoracic sclerites are illustrated and labelled in Fig. 6. Similarly, features of adult tubuliferans are illustrated and labelled in Fig. 7, of the five immature stages in Fig. 8a, b, c, d, e and a lateral view of thorax is illustrated and labelled in Fig. 9.

Fig. 4. Principal structures used in characterising imaginal Terebrantia (dorsal aspect (semi-diagrammatic) of female of *Thrips obscuratus*, redrawn from Mound and Walker, 1982).

ant	antenna
av	anterior vein
ct	ctenidia
ds	dorsal split
e	compound eye
f	femur
fr	fringe cilia
fs	forewing scale
fw	forewing
hw	hindwing
ms	mesonotum
mt	metanotum
o	ocellus
os	ocellar seta
pa	posteroangular seta
plt	pleurotergite
ps	postocular seta
pm	posteromarginal seta
pmc	posteromarginal comb
pr	pronotum
pv	posterior vein
sp	spiracle
t	tibia
tbr	tarsal bladder
tds	tergal discal seta
tg	tergite
tr	tarsus

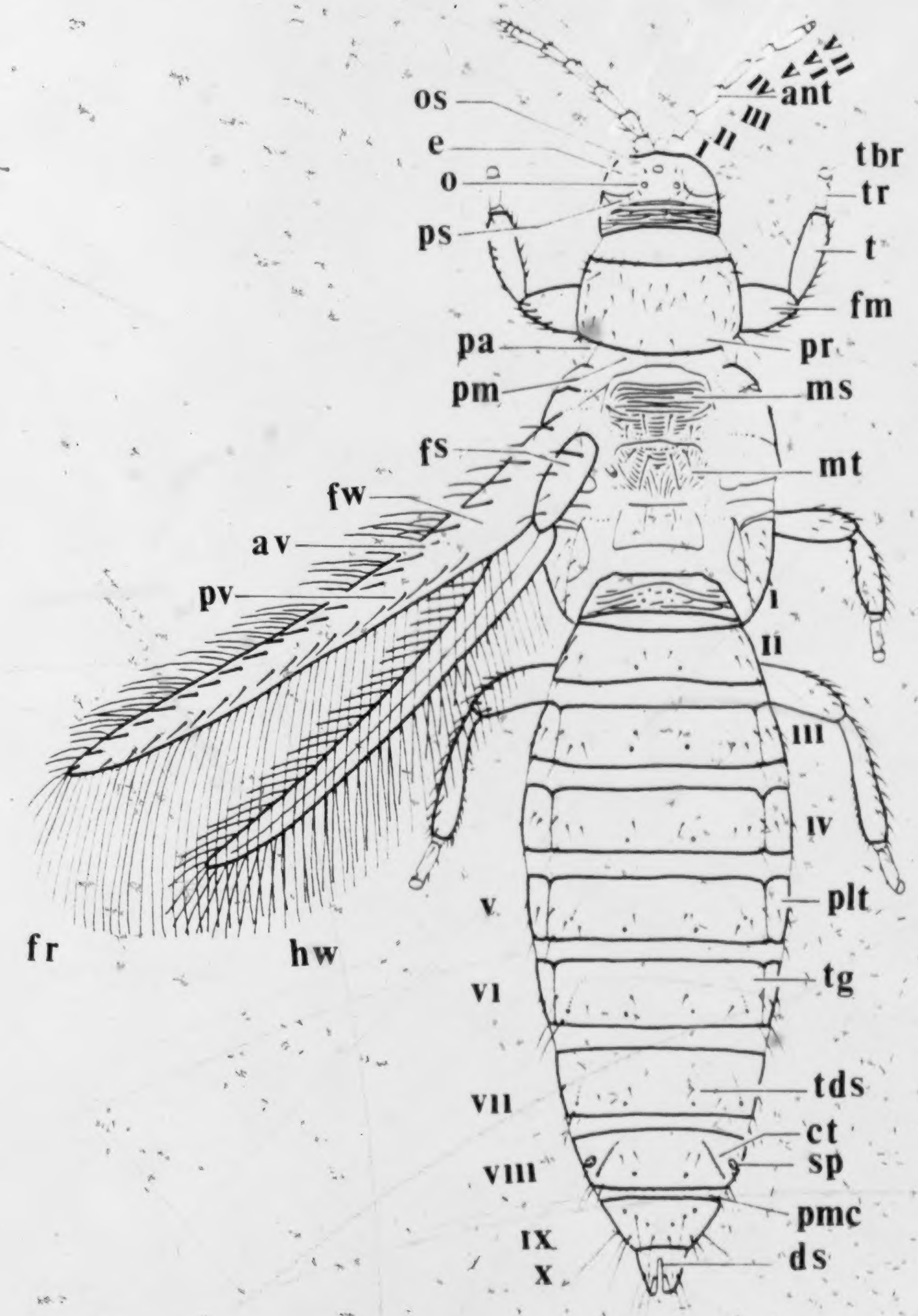
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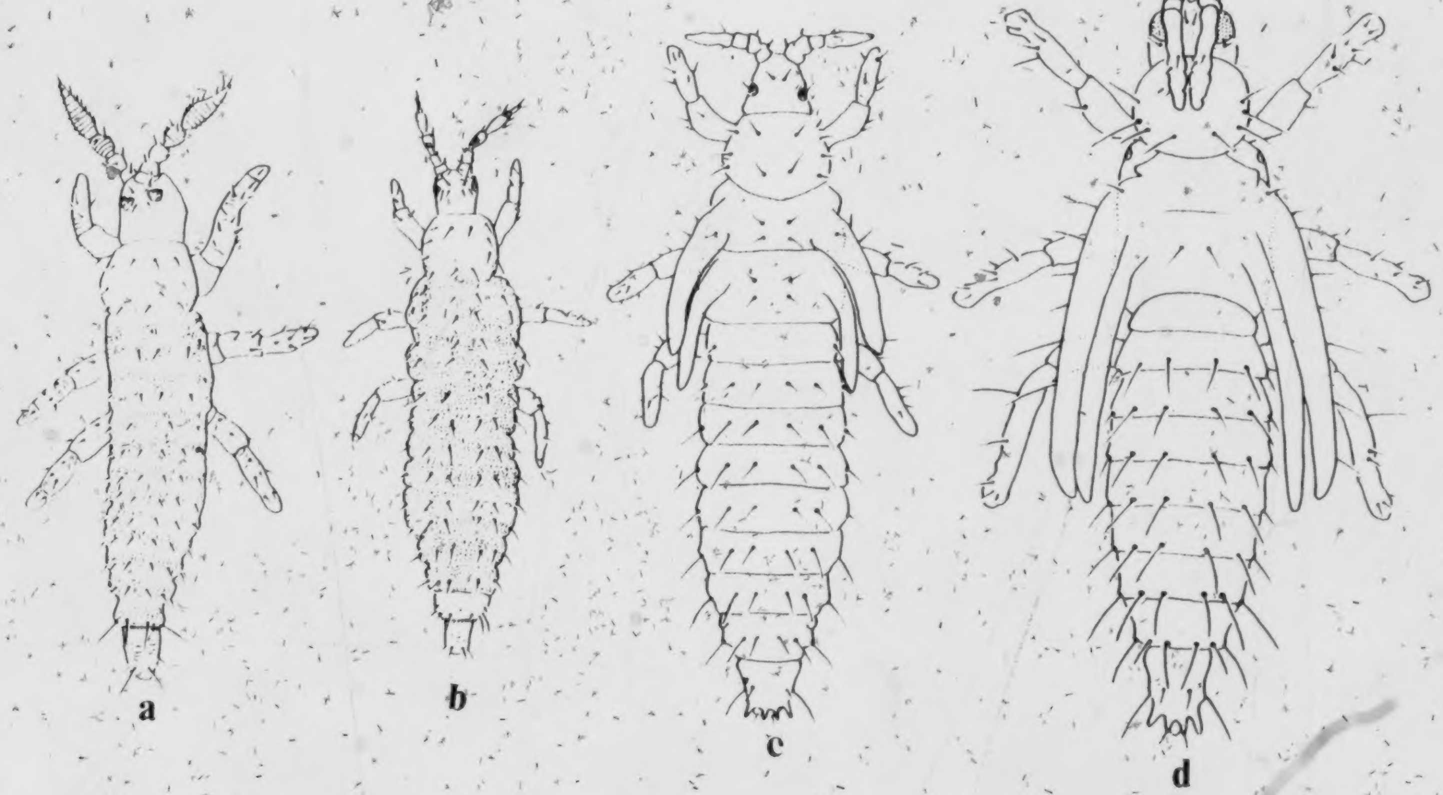
Fig. 5. Immature stages of Terebrantia (*Thrips obscuratus*, redrawn from Mound and Walker, 1982): a. Larva I b. Larva II c. Propupa d. Pupa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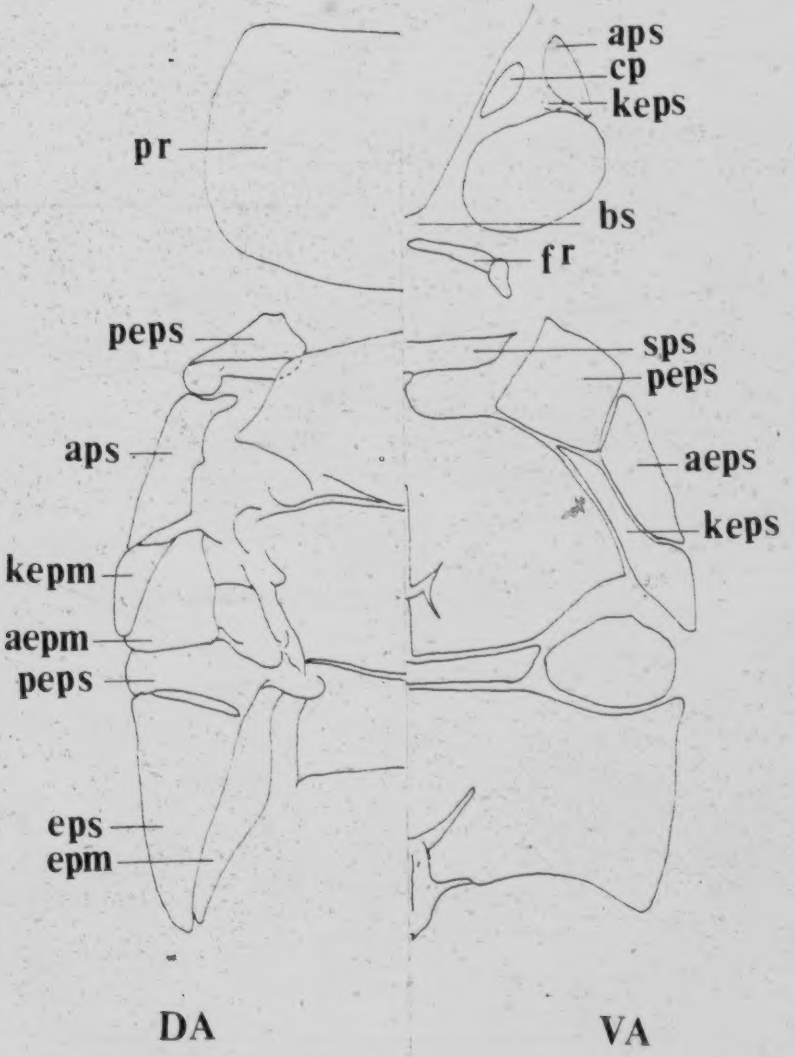
d

Fig. 6. Lateral pterothoracic sclerites of Terebrantia (semi-diagrammatic, redrawn from Mound and Walker, 1982).

aepm	anepimeron	fr	ferna
aps	anepisternum	kepm	katepimeron
bs	basantra	keps	?katepisternum
cp	cervical plate	peps	preepisternum
epm	epimeron	pr	pronotum
eps	episternum	sps	spinasternum
DA	dorsal aspect	VA	ventral aspect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DA
VA

Fig. 7. Principal structures used in characterising imaginal Tubulifera (dorsal aspect (semi-diagrammatic) of female of *Haplothrips niger*, redrawn from from Mound and Walker, 1986).

aa	anteroangular seta	ml	midlateral seta
am	anteromarginal seta	mls	mesonotal lateral seta
ant	antenna	ms	maxillary stylets
as	anal setae	msn	mesonotum
c	cheek	mt	metanotum
dc	duplicated cilia	o	ocellus
e	compound eye	os	ocellar seta
ep	epimeral seta	p	pelta
eps	epimeral suture	pa	posteroangular seta
ffm	forefemur	pm	posteromarginal seta
fr	fringe cilia	pos	postocular seta
fs	forewing scale	pp	praepectal plates
ft	foretibia	sn	sense cones
ftr	foretarsus	sp	spiracle
ftt	foretarsal tooth	sws	subbasal wing setae
fw	forewing	tbr	tarsal bladder
hw	hindwing	t II	tergite II
m	mouthcone	tls	tergal lateral seta
mb	maxillary bridge	wrs	wing retaining setae
mg	maxillary guide		

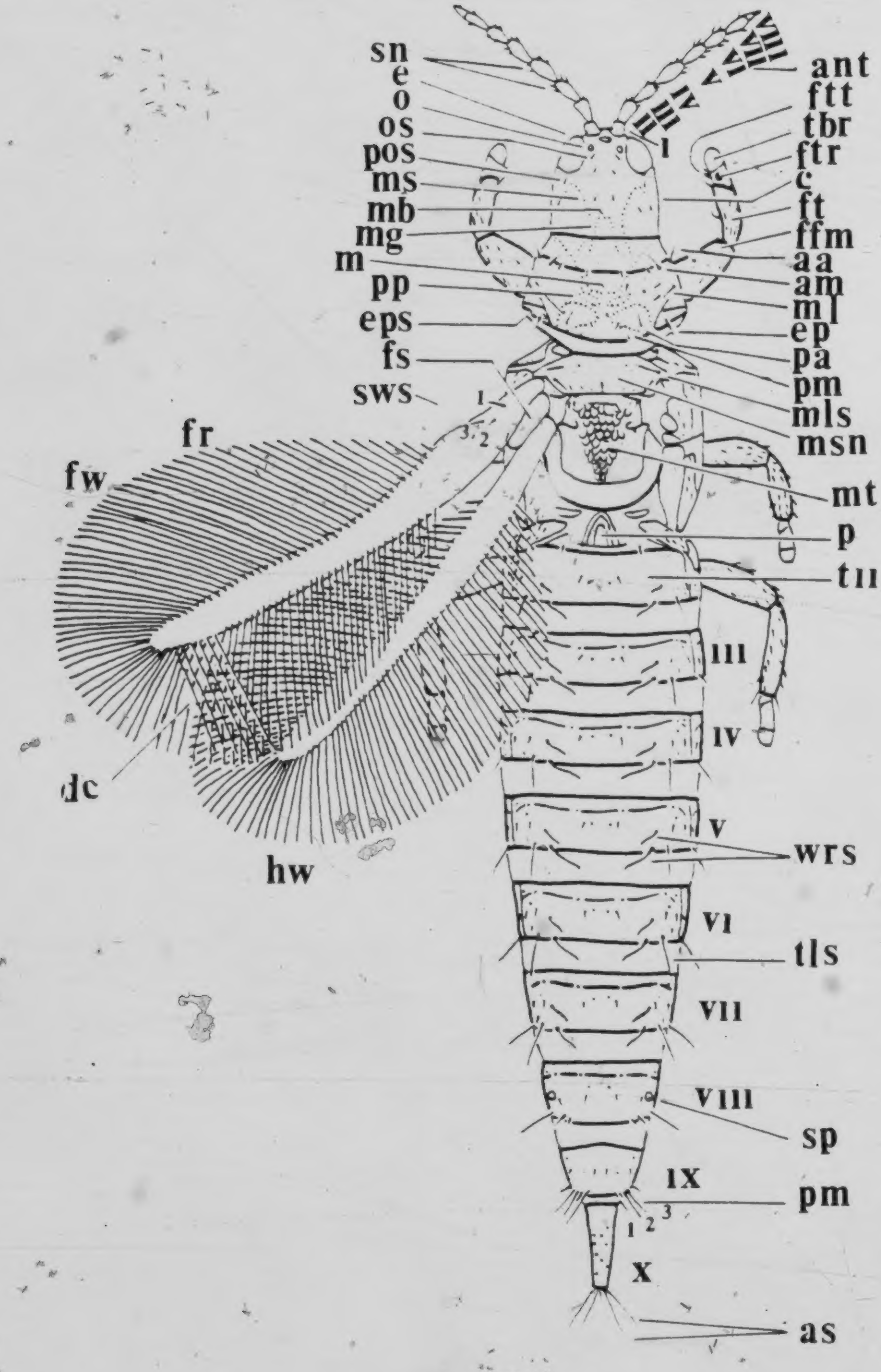
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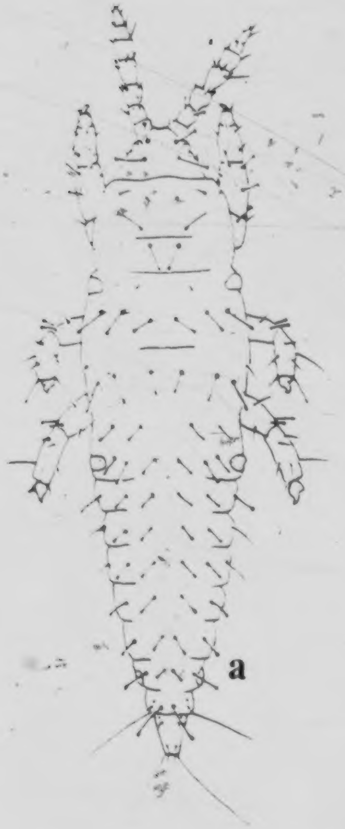
Fig. 8. Immature stages of Tubulifera (*Teuchothrips disjunctus*, redrawn from Mound and Walker, 1986). a. Larva I b. Larva II c. Propupa



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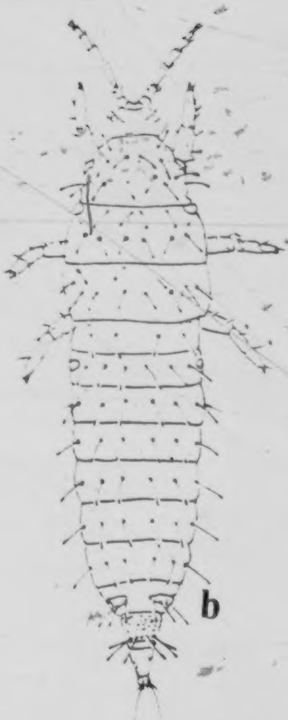

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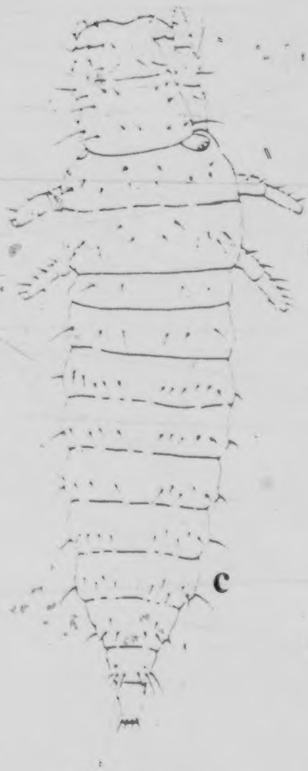
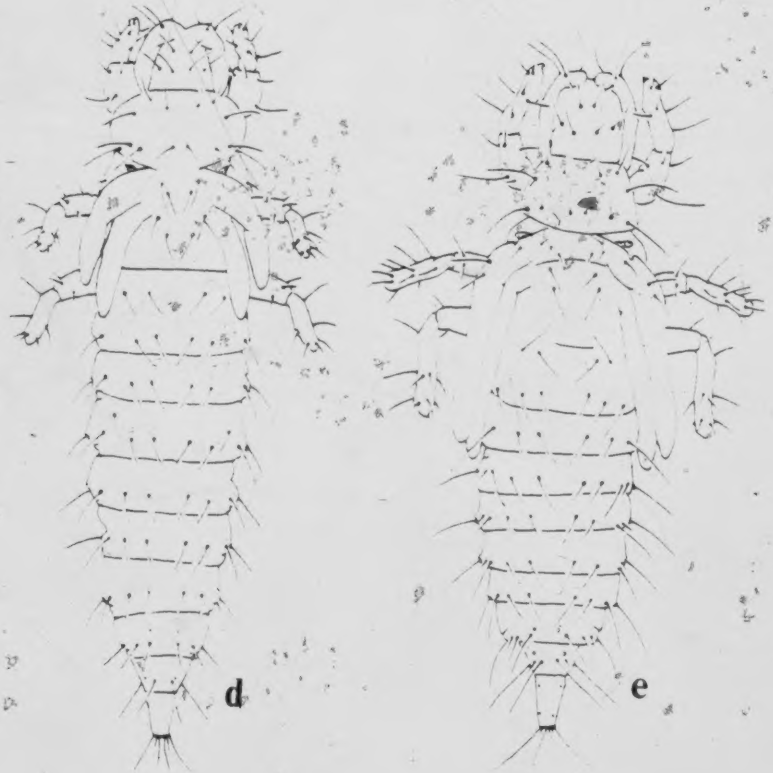


c

Fig. 8. Immature stages of Tubulifera (*Teuchothrips disjunctus*, redrawn from Mound and Walker, 1986). d. Pupa I e. Pupa II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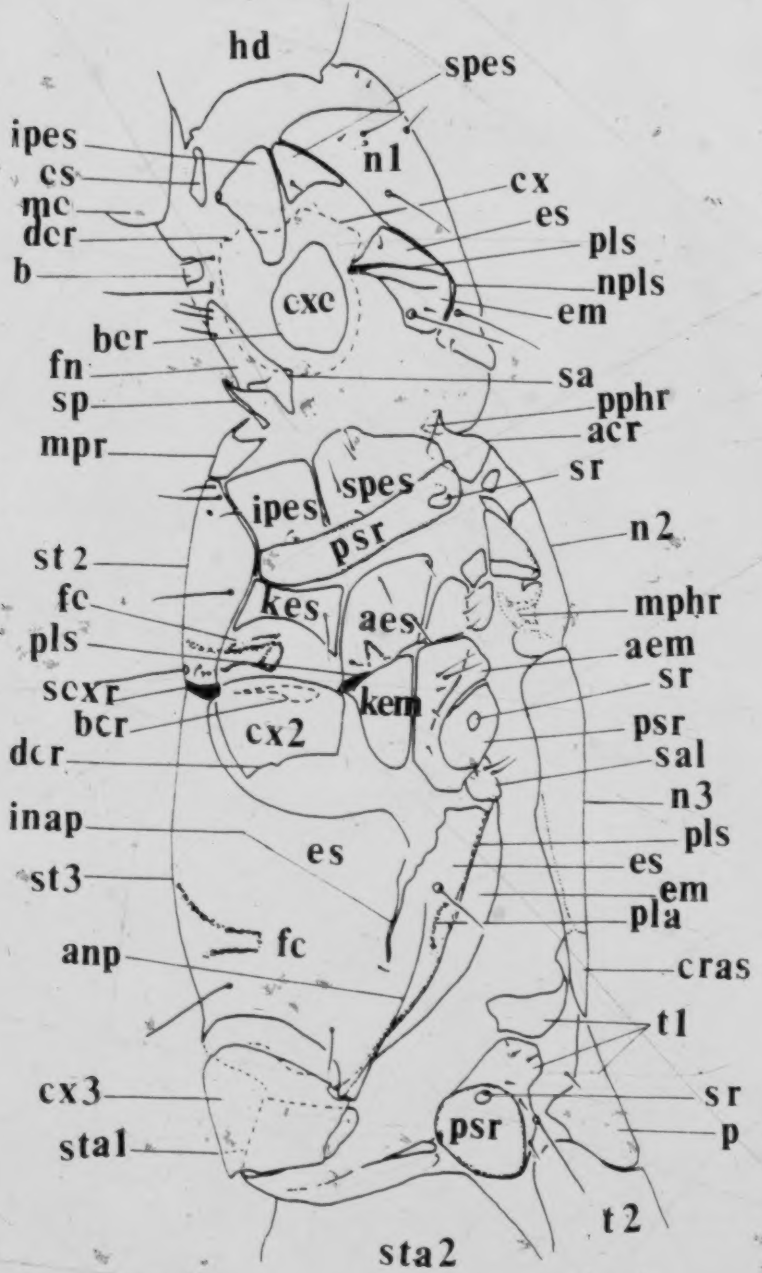
e

Fig. 9. Lateral view of thorax (*Ophidothrips* sp., redrawn from Bhatti, 1988).

acr	acrotergite
aem	anepimeron
aes	anepisternum
anp	anapleural suture
b	basantra/praepectus
bcr	basicoxal rim
cras	craspedum
cs	cervical sclerite
cx	outline of coxa
cxc	coxal cavity
cx2	coxa of mesothoracic leg
cx3	coxa of metathoracic leg
dcr	disticoxal rim
em	epimeron
es	episternum
fc	furca
fn	fema
hd	head
inap	infraanapleural suture
ipes	infrapreepisternum
kem	katepimeron
kes	katepisternum
mc	mouthcone
mphr	mesophragma
mpr	mesopresternum
npls	notopleural suture
n1	pronotum
n2	mesonotum
n3	metanotum
pla	pleural apophysis
pls	pleural suture
pphr	prophragma
psr	paraspiracular area
sta 1	abdominal sternite I
sta 2	abdominal sternite II
sal	subalare
scxr	sternacoxal ridge
sa	sternal apophysis
spes	suprapreepisternum
sr	spiracle
st 2	mesosternum
st 3	metasternum
t 1	abdominal tergite I
t 2	abdominal tergite II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Head (Figs. 11a, 12a, 16a, 18a, 19a, 24a, 29a, 31a, 33a, 37a, 38a, 43a, 45a, 48a, 49a, 54a, 58a, 59a, 60a)

In adult thrips, the head is usually compressed dorsoventrally but especially in certain tubuliferans it is considerably deeper. It varies in length from more than twice as long as wide, to slightly wider than long and the vertex is slightly or moderately produced in front of the eyes. Compound eyes are well developed dorsolaterally in most thrips but prolonged ventrally in some aeolothripids. In phlaeothripids, they are reduced to a few facets in certain apterae, are prolonged ventrally, or are moderately enlarged such that the head is holoptic as in *Macropthalmothrips* spp. Ocellar setae of terebrantians constitute 2 or 3 pairs with pair 3 varying in length and position in members of some taxa. Additional pairs of postocular setae are arranged in a straight, transverse row as in *Thrips* spp. or irregularly as in *Stenchaetothrips spp.* In most tubuliferans, a single pair of major, postocular setae is present although adults of some species have two pairs as in *Adelphothrips* spp. Major setae are present laterally on the cheeks that are either slender, or robust and moderately developed as in *Mesothrips* spp.

Ventrally, the mouthcone is hypognathous and short and rounded, or opisthognathous and elongate, to very long, pointed and produced caudad between the forecoxae as in *Tusothrips* adults. The mouthparts within are moderately asymmetric; the left mandible is well developed and functional while the right mandible is absent or is moderately reduced and fused with the head. The paired maxillary stylets vary in length and diameter among species in tubuliferans but are short and confined to the mouthcone in terebrantians. Maxillary palpi are 2-or 3- segmented in terebrantians and 2- segmented in tubuliferans, and labial palpi 2- segmented in members of both groups.

Sculpture of the head, especially in panchaetothripines and phlaeothripids may be of use in generic and specific diagnosis.

Antennae (Figs. 11b, 12b, 16b, 18b, 19b, 24b, 29b, 31b, 33b, 37b, 38b, 43b, 48b, 49b, 54b, 58b, 59b, 60b)

As a result of progressive fusion of distal flagellomeres, imaginal antennae vary interspecifically from 6 to 9 segments in terebrantians and 7 to 8 in tubuliferans. In adults of *Thrips hawaiiensis*, the most common species in the Philippines, the antennae are either 7 or 8- segmented. Sense cones (multiporous chemosensilla), and their shape, number and position on segments III and IV, and on V and VI of some taxa are of use in family, generic, and specific identification. Segments III and IV bear a linear, longitudinal sensorium in *Franklinothrips* spp. or one or more simple or forked sense cones in most thripids. In phlaeothripids, one or more sense cones are present on segments III and IV which vary in length and thickness between species or genera. The surface of antennal segments is smooth, or sculptured, and with or without transverse rows of microtrichia on the intermediate segments. Size and relative position of a campaniform sensillum near the dorsal apex of segment II may be of use in differentiating between members of certain taxa such as those of the *Taeniothrips* complex.

Thorax (Figs. 12c, 16c, 18c, 19c, 24c, 29c, 31c, 33c, 37c, 38c, 43c, 45b, 48c, 49c, 54c, 58c, 59c, 60c)

A pronotum and 2 epimeral sclerites are visible dorsally on the prothorax except in aeolothripids and thripids. In phlaeothripids, the epimeral sutures - absent, incomplete or complete - are used to assist in identification of genera and species. Usually, there are five pairs of major pronotal setae: anteromarginals (am), anteroangulars (aa), midlaterals (ml), epimerals (e), and posteroangulars (pa). In members of many taxa, certain marginal setae are long; these are usually the posteroangulars, but may also include the anteromarginals, anteroangulars, and midlaterals as in *Frankliniella* spp.

Ventrally, the median, anterior area of the prosternum, the praepectus or basantra, is slightly sclerotized and membranous in most taxa. Behind this are two transverse sclerites, the fernae, which are fused medially in certain terebrantians. In some tubuliferans, a pair of praepectal or basantral plates are present in this area. When present, their width and length vary between members of certain genera and assist in differentiating between members of some *Haplothrips* spp. and some *Podothrips* spp. Behind the praepectal plates are a pair of probasisternal sclerites and a small median sclerite, the spinasternum.

In the pterothorax, the relative positions of median setae on the mesonotum and metanotum (metascutum) are useful diagnostic characters. The sculpture of these sclerites and the chaetotaxy of the lateral sclerites are also useful in identification of species.

Ventrally, the shape of the mesopraesternum, which is boat-shaped in most phlaeothripids, is also useful in panchaetothripines. The presence or absence of metathoracic, sternopleural sutures which extend posteriorly from the mesothoracic coxal cavities are useful in identification of genera of phlaeothripids.

Internally, the mesothoracic and metathoracic endofurcae have or lack a spinula. Presence or absence of these on both or either endofurcae are used as diagnostic characters in thripids. They are best developed in members of leaf feeding species that are able to jump. In *Ranjana* spp., both meso and metathoracic spinulae are present. Adults of jumping species with large extrinsic trochanteral depressor muscles such as *Caliothrips* and *Dendrothrips* spp. possess lyre-shaped metathoracic endofurcae on which these muscles originate.

In most apterous forms, the pterothorax is shorter and wider than that of macropterae and much simplified in structure. Sculpture of the pterothorax, especially of the metanotum is used to differentiate species.

Legs (Figs. 69d, 102c)

Tarsi are either 1 or 2-segmented. The foretarsi in members of some taxa have a tooth on the inner margin which varies in size and orientation. Most male phlaeothripids have a larger tooth and, ventrally, the apex of each tarsus is prolonged into claw-like hook, the hamus. In some larger males, the forefemora are swollen and trichobothrium- like sense organs are present on their inner margins. The hindtibiae bear one or more long setae on their external margins and, in most thripids, the hindtibiae bear a row of stout setae that are used in spreading the wing cilia prior to flight (Ellington, 1980).

Wings (Figs. 11c, 12d, 16d, 18e, 19d, 29d, 31d, 33d, 37d, 38d, 48d, 49d, 54d, 58d, 59d, 60d)

Unlike terebrantian forewings which have two longitudinal veins, tubuliferan wings lack veins. The anterior and posterior margins of the wings bear fringes of hairs which are straight or wavy. In terebrantians, these hairs are socketed, and seta-like while they are unsocketed extensions of the wing membrane in tubuliferans (Mound and Walker, 1986). The anterior fringe hairs are shorter than the costal setae in some panchaetothripines. The posterior margins of the forewings bear a double row of cilia in most terebrantians whereas, in phlaeothripids, duplicated or accessory cilia at the wing apex are few or absent. The anterior forevein is totally or partially fused to the costa in panchaetothripines. The number and position of anterior forevein setae is of use in identifying genera and species of terebrantians. Three or more cross veins are present in wings of aeolothripids, adiheterothripids and some merothripids and one or two in fauriellids, heterothripids and thripids (only aeolothripids and thripids are known in the Philippines).

Macropterous, micropterous, brachypterous and apterous individuals are present in certain species of both suborders.

Abdomen (Figs. 18f, g, 19e, 24e, 29e, f, 37e, f, 38e, f, 43e, f, 45c, d, e, 58e)

Tergal and sternal setae are named as follows: the median pair is designated B_1, the submedian pair B_2, the next pair B_3, etc.

Tergite X is well developed in most terebrantians and is tube-like in *Panchaeothrips* spp. and in tubuliferans. Tergite 1 is or is not reduced to a small sclerite, the pelta, in tubuliferans. Tergites II-VII each bear various numbers of discal setae with the median pair be placed close together or far apart. These are pointed or expanded, and short or long. Abdominal tergites, sternites and pleurites of some species bear distinctive sculpture or reticulation medially or laterally on either side. Tergite II of panchaetothripines bears distinctive sculpture laterally. In *Frankliniella* , *Thrips* and *Stenchaetothrips* spp. tergites V-VIII bear a pair of lateral ctenidia which Mound and Walker (1982) suggest are involved in grooming or in freeing the wings for flight. In tubuliferans, wing retaining setae of 1 or more pairs are present on each of tergites II to VII or on VIII in some taxa and are simple, curved or sigmoidal. Tergite VIII has or lacks posteromarginal teeth or a comb of microtrichia as in *Fulmekiola* and *Microcephalothrips* spp. and in members of the tribe Dendrothripini. Laterally, and anteriad or posteriad the spiracles on tergite VIII, a pair of ctenidia or sparse microtrichia are or are not present. Dense microtrichia cover the sides of the abdominal segments in members of *Scirtothrips* spp.

In males, tergite IX bears a pair of slender or stout, median setae. Their shape, degree of sclerotization, length and distance from the submedian pair are useful diagnostic characters for members of some genera. Tergite X is entire, or partially or completely divided longitudinally on the midline in terebrantians and in some taxa has strong or weak, pointed, rounded, or dilated setae. In tubuliferans, shape and length of the anal tube (segment X) varies as does the number and length of hairs it bears laterally. Anal setae vary in length in different species.

In terebrantians, male sternites II-VII and in some taxa VIII bear one or more glandular areas which vary in size and shape. In *Trichromothrips* males, sternite VIII bears circular or subcircular glandular areas. Male external genitalia have taxonomic value in members of certain genera of Terebrantia such as *Taeniothrips*, *Odontothrips* (not known in the Philippines) and *Thrips* . Accessory setae on the sternites may be useful in differentiating certain *Thrips* and *Bolacothrips* spp.

Most female terebrantians have an ovipositor of four, saw-like valves borne by segments VIII and IX which curves upward in aeolothripids and certain merothripids and downwards in most other terebrantians, but these are slightly developed and almost straight in *Merothrips* and *Plesiothrips* spp. In tubuliferan females, the ovipositor is an eversible, chute-like structure.

2.2.3. ILLUSTRATION

Line drawings of structural features were made with the aid of a drawing tube attached to a Nikon Optiphot compound microscope. Characteristics of each species were drawn in comparable positions . After inking, drawings were compared with specimens for accuracy. Scale lines on the drawings equal 0.1mm.

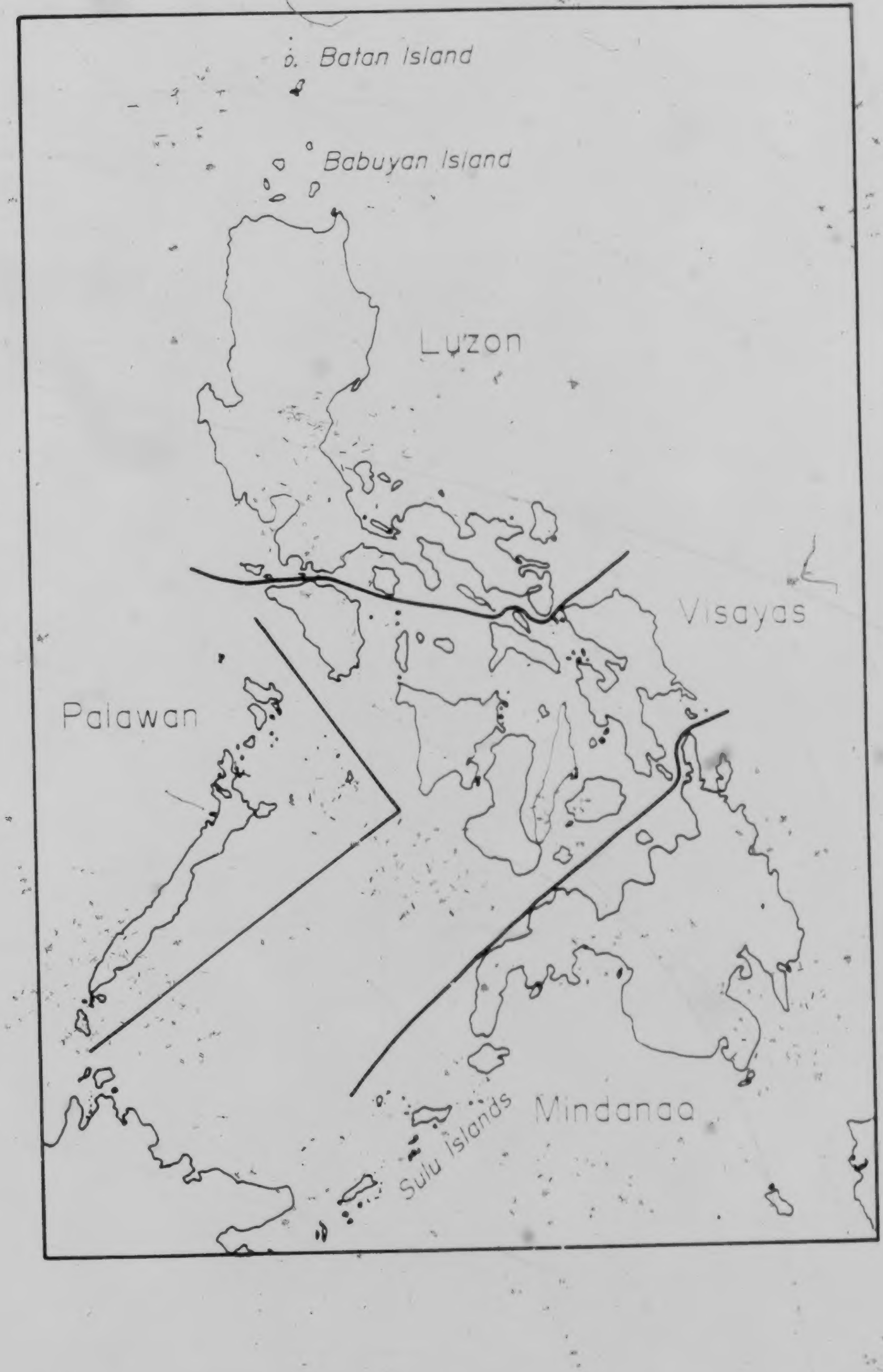
2.2.4 DESCRIPTIVE FORMAT

For previously described species, reference to the original publication of the valid name and of its first record in the Philippines are provided, with repositories of type specimens following in parentheses. Misidentifications, where determined, are also included as synonyms.

Label data for type specimens of new species are cited in full. Data are recorded exactly as on the labels, with additional information included in square brackets. Repositories for all types are given in parentheses. Descriptions of holotype specimen or in a few instances of lectotype or syntype of each species are given in full and precede those of the allotype.

Information regarding geographical distribution and host plants, when available, is taken from label data, field notes and published literature with a cut off date of May, 1989. These data are listed for each species. For distribution, the Philippines is subdivided into 4 island groups: Luzon, Visayas, Palawan and Mindanao (Fig. 10). World distributional information is summarized in maps provided except for a few cosmopolitan species. I consider a genus to be a taxon in the Linnean hierarchy containing a single species, or a monophyletic group of species separated from other taxa of similar rank by a decided gap in structure (Mayr, 1969: 92). To be regarded as monophyletic, specimens representing a group of species had to share 2 or more unique, derived characters. Within monophyletic groups, the recognition of genera is based on distinctiveness from other monophyletic groups and on degree of intrageneric structural divergence of greater extent than that separating species. The principal characters used to define a genus are the following: size and shape of head; size of ocelli; number of ocellar setae; size of eyes; number of

Fig. 10. Map of the Philippine Islands subdivided into 4 regions.


Batan Island
Babuyan Island
Luzon
Visayas
Palawan
Mindanao
Sulu Islands

postoculars; number and shape of antennal segments; number of sense cones on antennal segments III and IV; number of maxillary palpal segments; number of pronotal posteromarginal setae; presence or absence of epimeral sutures if applicable; number of tarsal segments; shape and setal chaetotaxy of forewings; meso and metasternal spinulae; sculpture and teeth or microtrichia on abdominal tergites; and shape of abdominal tergites I and X .

As for the species, my concept is of the biological species concept as expounded by Mayr (1969: 25). Reproductive isolation is inferred to exist between members of groups based on the existence of structural gaps between them. Forms differing in 3 or more structural attributes and occurring either sympatrically or allopatrically were considered to represent separate species. The principal characters used to define a species are the following: sculpture and color of head; size and position of ocellars, postoculars and cheek setae; size of the ommatidia of compound eyes, if stringkingly different; color of antennal segments; size of sense cones especially on antennal segments III and IV; shape and size of mouthcone; sculpture and color of pronotum; size of pronotal posteromarginal setae; length of epimeral sutures if applicable; presence or absence of praepectal plates (praepectus for terebrantian species is usually membranous and difficult to see); color and position of cross bands and number, size and position of veinal setae on forewings when applicable; size and femoral armatures; tibial or tarsal spines or teeth; sculpture on meso and metanota; position of median setae and presence or absence of campaniform sensilla on metascutum, when found highly variable in species included in a certain genus; sculpture and color of abdominal tergites; shape of pelta and number of tergal wing retaining setae of tubuliferan species; position of setae on tergites especially of median setae on tergite IX and number, shape and position of glandular areas in males.

2.2.5. ABBREVIATIONS

The following abbreviations are used in the descriptions: aa, anteroangular setae on pronotum; am, anteromarginal setae on pronotum; ml, midlateral setae on on pronotum; pa, posteroangular setae on pronotum; ep, epimeral setae on pronotum; pm, posteromarginal setae on pronotum; S, subbasal wing setae of forewing scale; B1, median pair of major setae at or near posterior margin of tergite; B2, submedian pair of major setae at or near posterior margin of tergite; B3, outside pair of major setae at or near posterior margin of tergite.

3. LIFE HISTORY

Studies on the life history of thrips in the Philippines are few and are confined to pest species. Most of these works are unpublished, student research reports at the University of the Philippines at Los Banos. Below I summarize general information about life history of thrips.

Postembryonic development of thrips is between currently accepted types of metamorphosis. Pesson (1951) regarded the postembryonic development as incomplete metamorphosis at a higher level than that of male coccoids which seemed transitional between paurometabolous and holometabolous. In 1970, using levels of differentiation of the female reproductive system of immature thrips as his basis, Heming (1970a) concluded that the type of metamorphosis of thrips is intermediate between those of exopterygote and endopterygote insects, a metamorphosis referred to as "remetaboly" by Takahashi (1921).

Thrips pass through the following stages: egg, larva 1, larva 2, propupa, pupa (pupae 1 and 2 in tubuliferans), and adult (Figs. 5, 8). A complete generation requires 10 days to 22 months, depending on species, availability and quality of food and environmental conditions. In *Scirtothrips dorsalis*, it requires 14 to 20 days and is highly dependent on temperature (Ananthakrishnan,1969).

Thrips are bisexual or parthenogenetic depending on species. In some species, sexual reproduction and parthenogenesis occurs simultaneously, especially at the beginning of a season when females dominate the population (Ananthakrishnan,1969).

Parthenogenetically developing eggs give rise to female (thelotoky) or male (arrhenotoky) individuals. Sex determination in these eggs may be influenced by temperature (Lewis,1973). In species wherein sexes are produced in equal numbers, females predominate in the population because they outlive males.

Most studies of mating and oviposition in thrips were reviewed by Lewis (1973) and Ananthakrishnan (1984). In general, thrips are ready to mate 2 to 3 days after adult eclosion. Males are promiscuous and can fertilize many females. The sexes may find each other by use of their antennal sense cones and eyes (Lewis, 1973). Klocke (1926), Pelikan (1951), Bode (1978) and Kirk (1985a) have suggested that glandular areas on the abdominal sternites of some male thripids and heterothripids may assist the males during mating by secreting aromatic components that soothe the excited female and discourage her from running around.

Unusual forms of mating occur in some species of thrips. In *Chirothrips mexicanus* and *Limothrips denticornis* (not known in the Philippines) apterous males mate with female pupae (Bournier, 1956; Ananthakrishnan,1984).

Most terebrantian females lay their eggs singly in an incision made in plant tissue by their ovipositor while tubuliferans lay their eggs in clusters many of which are glued to the surfaces of leaves, flowers, or within galls, or in galleries in wood made by other insects. In contrast to a terebrantian, the ovipositor of which must saw plant tissues before it can oviposit, the act of oviposition in tubuliferans lasts only a few seconds. As expected, egg mortality is greater in tubuliferans than in terebrantians because eggs of the former are more vulnerable to desiccation and predation (Lewis,1973). As for terebrantians with weak ovipositors (*Merothrips* and *Plesiothrips* spp.), their eggs are probably glued to the fungal substrate of dead twigs and leaves (Mound and Walker, 1982).

Female thrips lay from 5 to 300 eggs during their life span depending on species and environmental conditions (Ananthakrishnan,1984). In *Stenchaetothrips biformis*, for example, fecundity of females varied from 5 to 47 eggs per female (Nugaliyadde and Heinrichs, 1984). Females laid eggs singly in incisions made over the entire abaxial surface of the youngest leaf blade of rice where they appeared as translucent swellings. Eggs of most terebrantians are bean-shaped with colorless, unsculptured shells and those of some species have an operculum (Lewis, 1973; Kirk, 1985b). In many tubuliferans, the eggs are whitish or yellowish with polygonally or hexagonally sculptured shells. In

Haplothrips verbasci (not known in the Philippines), they have a porous, cap-like aeropyle at the anterior end and a micropyle placed posteroventrally (Heming, 1979).

Studies of embryogenesis of thrips are few. Information about this topic was first generated by Uljanin (1874) who described embryos of *Thrips physopus* . Contributions to present knowledge are the works of Bournier (1966) on eggs of *Caudothrips buffai*, of Heming (1979, 1980) on those of *Haplothrips verbasci*, of Haga (1985) on *Bactrothrips brevitubus* eggs and of Moritz (1987) on eggs of *Hercinothrips femoralis*, *Frankliniella tenuicornis* and *Aeolothrips astutus*.

Order Thysanoptera Haliday

Thysanoptera Haliday, 1836: 439.

Diagnosis. Head usually compressed dorsoventrally, width and length variable. Two or three ocelli present in winged adults; absent from wingless adults. Ocellar setae 2 or 3 pairs. Eyes well developed or reduced to a few facets. Postocular setae 1 or more pairs. Antennae 6- to 9-segmented; segments III and IV each with sensoria or 1 or more emergent sense cones. Clypeus greatly enlarged. Mouthparts asymmetric; left mandibular stylet well developed; right mandible atrophied. Maxillary stylets confined within mouthcone or retracted into head capsule; maxillary palpi 2- or 3-segmented. Labial palpi 2-segmented. Mouthcone hypo- or opisthognath, short and rounded to long and narrow.

Pronotum moderately large; epimeral sclerites differentiated or not; discal setae few to numerous; setae on angles well developed in most taxa. Wings present or absent; when present, 2 pairs and membranous, fully developed or reduced; wing coupling mechanism of hamulate type. Forewings broad or narrow; anterior and posterior fringe cilia present in most individuals; anterior cilia absent from few individuals; longitudinal veins and veinal setae present or absent; surface of wings with or without microtrichia. Tarsi 1- or 2-segmented, terminated in protrusible bladder, with or without hook-like tooth or hamus at apex.

Abdomen 11-segmented; tergite XI rudimentary. Tergites I and VIII each with pair of spiracles. Median tergites and in some taxa, VIII, each with or without wing retaining setae. Tergite X tapered or tube-like. Females with external, saw-like ovipositor, or eversible, chute-like ovipositor contained ventrally between abdominal tergites IX and X. Cerci absent. Median sternites with or w[illegible] glandular areas in males.

The world fauna of Thysanoptera is presently known to consist of about 4,700 species (Mound and Walker, 1986) placed in 2 suborders and 8 families (Mound, Heming and Palmer, 1980). Of these, 195 species in 2 suborders and 3 families are here recorded from the Philippines. Catalogues of the Thysanoptera of the world are provided by Jacot-Guillarmod (1970, 1971, 1974, 1975, 1978, 1979) and Jacot-Guillarmod and Brothers (1986). Bhatti (1988) recognized the Thysanoptera as a superorder of subcohort Condylognatha.

Key to Suborders, Families and Subfamilies of the Philippine Thysanoptera

1. Abdominal segment X (Fig. 4) invaginated ventrally to contain ovipositor, or tube-like; females with well developed, or small saw-like ovipositor; forewings (if present) with longitudinal veins, each with row of setae; wing surface with or without numerous microtrichia .... TEREBRANTIA, 2

1' Abdominal segment X tube-like (Fig. 7) in both sexes; females with short, chute-like ovipositor ventrally between tergites VIII and IX; forewings (if present) without longitudinal veins; wing surface without microtrichia ....TUBULIFERA, Phlaeothripidae, 4

2(1) Forewings broad, rounded at apex, with 4 cross veins (Fig. 12d); antennae 9-segmented, sensoria on antennal segments III and IV longitudinally oriented along segments (Fig. 11b); female ovipositor upturned .... Aeolothripidae

2' Forewings narrow, pointed at apex or not, with less than 4 cross veins (Fig. 16d); antennae 6 to 9-segmented, sensoria on antennal segments III and IV with simple or forked sense cones; female ovipositor downturned or moderately reduced .... Thripidae, 3

3(2') Head and thorax conspicuously reticulate (Fig. 16a); antennae with terminal segment or style extremely long (Fig. 19b); forewings with anterior vein fused or not to costal vein in basal third (Fig. 16d); anterior fringe cilia present or absent .... Panchaetothripinae

3' Head and thorax striate or reticulate, but not raised (Fig. 24a); antennae with terminal segment or style shorter (Fig. 24b); forewings with anterior vein fused or not to costal vein, or fused in basal third; anterior fringe cilia present or absent .... Thripinae

4(1') Abdominal tergite IX with B2 setae elongate; maxillary stylets 1-6 um in diameter (Fig. 68a) .... Phlaeothripinae

4' Abdominal tergite IX with B2 setae stout and short; maxillary stylets 5-10 um in diameter (Fig. 62a) .... Idolothripinae

Suborder Terebrantia Haliday

Terebrantia Haliday, 1836: 443.

Diagnosis. Head wider than long or at most 1.5 times as long as wide (Fig. 4). Two or three ocelli present in winged forms, absent from wingless forms. Ocellar setae 2 or 3 pairs. Eyes equally developed or prolonged ventrally, with or without few setae between ommatidia. Postocular setae developed or reduced. Antenna 6- to 9-segmented; segments III and IV each with sensoria or simple or forked sense cone. Maxillary stylets confined to mouthcone; maxillary palpi 2- or 3-segmented. Mouthcone short and broad in most taxa, narrow and slender in few.

Pronotum setose or with few setae; epimeral sutures absent in most taxa, present in few. Forewings with longitudinal veins; veinal setae minute to developed; posterior fringe cilia in sockets and straight or wavy; surface of wings completely or incompletely covered with microtrichia. Tarsi 1- or 2-segmented. Praepectus or basantra slightly sclerotized or membranous, divided or not divided into 2 plates. Ferna separate in most taxa, fused medially in few taxa. Mesopraesternum absent. Mesospinasternum fused with metasternum or separated by suture.

Abdominal tergites and pleurites fused or separated by sutures. Tergite I entire, in few taxa moderately narrowed at base. Tergites II-VII without wing retaining setae in most taxa, present in members of few species. Tergite X invaginated ventrally, tapered or not; ventral surface divided longitudinally; anal setae arising directly from tergite X. Females with saw-like ovipositor, weak or degenerate in some taxa. Median sternites with one or more glandular areas in males of most taxa; few females with glandular areas.

The suborder Terebrantia is presently known to consist of about 2,000 species (Mound and Walker, 1986) placed in 7 families (Mound, Heming and Palmer, 1980). Of these, 87 species in 2 families and 43 genera are here recorded from the Philippines. Bhatti (1988) recognized the Terebrantia as an Order in the superorder Thysanoptera.

Family Aeolothripidae Uzel

Aeolothripidae Uzel, 1895: 62.

Diagnosis. Head about as wide as or wider than long. Ocelli present. Eyes prolonged ventrally in most taxa. Antennae 8-or 9-segmented; intermediate segments elongate; sensoria on antennal segments III and IV longitudinally oriented along segments, in some taxa curved around apex of segment. Maxillary palpi 3- segmented, with distal segment subdivided into several subunits. Mouthcone short and broad.

Pronotum setose or with few setae, small in most taxa. Wings fully developed or reduced. Forewings broad, expanded or not at apex; 2 longitudinal veins and several cross veins present; anterior fringe cilia absent from most taxa. Tarsi 2-segmented; foretarsi with hook-like tooth or hamus in most taxa. Mesospinasternum separated by suture from metasternum.

Abdomen constricted at base. Tergites and pleurites fused, differentiated by a weak suture in few taxa. Tergite X of most females with pair of small trichobothria. Female ovipositor, upturned. In males of most taxa, tergite I with 2 longitudinal ridges; sternal glandular areas absent; genital claspers present or absent. Sternites with accessory setae in most taxa.

This is the first record of the family Aeolothripidae in the Philippines. Aeolothripids are distributed mainly in the temperate parts of the world, although members of several genera are restricted to the tropics (Mound, Heming and Palmer, 1980). Adults of many species are regarded as predatory on other small arthropods, including thrips larvae; those of a few are phytophagous (Mound and Houston, 1987). About 220 species in 25 genera are presently recognized in the family worldwide (Mound and Houston, 1987). Of these, only 2 species in 2 genera are known from the Philippines.

Key to genera and species of the Philippine Aeolothripidae

1. Antennal segment III about 8 times as long as segment II, sensoria of segments III and IV extended along entire length of each segment (Fig. 11b); antennal segment IV longer than segment III .... *Franklinothrips rarosae*, n. sp.

1' Antennal segment III about 2 times as long as segment II, sensoria of segments III and IV confined to apical half of each segments (Fig. 12b); antennal segment IV shorter than segment III .... *Streothrips alaris*, n. sp.

Genus *Franklinothrips* Back

Franklinothrips Back, 1912:75

Type species: *Aeolothrips vespiformis* Crawford; by monotypy.

Diagnosis. Head round to oval; eyes very large, more than half length of head and more prolonged ventrally than dorsally; ocelli present, foreocellus smaller than posterior pair in most taxa. Antennae 9-segmented, segments III and IV at least 10 times as long as wide, sensoria linear, more or less subdivided by fine, subdermal ridges; sensoria in males cover entire ventro- lateral area of segments. Maxillary palpi 3-segmented; labial palpi 4-segmented. Mouthcone narrowly pointed.

Pronotum small, with setae but with no well developed setae on angles; mesosternellum (area posterior to mesofurcal suture) fused with metasternum. Legs long and slender; tarsi 2-segmented. Forewings wider apically, with dark cross bands; microtrichia small; longitudinal and cross veins faint.

Abdomen narrowly attached to thorax, elongate. Abdominal segments I-V narrower than posterior segments in some females. Tergite X with long setae.

The ventral sensoria of antennal segments III and IV are unique to adults of *Franklinothrips* species. About 12 species are known, distributed mainly in the tropics (Stannard, 1952; Okajima, 1979b; Mound and Houston, 1987). A new species *F. tarosae* is described below from the Philippines.

Franklinothrips rarosae, n. sp.
Holotype male, Philippines: Visayas: Mt. Pangasugan, Leyte (**UPLB**).
Figure 11a, b, c

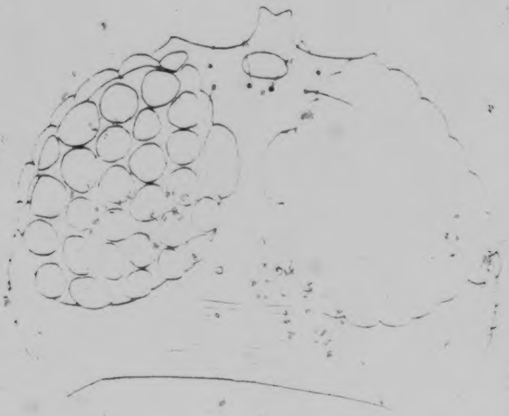
Diagnosis. Body bicolored. Head, pronotum, meso and metascuta and abdominal tergites I and VIII to X brown; tergites II to VII white, shaded with brown medially and laterally. Head rounded, with transverse striae. Interocellar setae developed. Antennal segment IV longer than III, each with sensoria extended entire length of segment. Pronotal major setae well developed. Legs bicolored. Forewings with 2 dark, cross bands; apex brown. Abdomen narrowly attached to thorax. Tergite I longer than tergite IX.

Members of *F. rarosae*, n. sp. resemble those of the *F. megalops -tenuicornis* group known from Africa and South America, in having long ocellar setae. This species differ from *F. tenuicornis* Hood, in having antennal segment IV longer than III; antennal segments I to IV yellow; cheek and ocellar setae slender, and dorsal length of eyes more than 0.5 times as long as head.

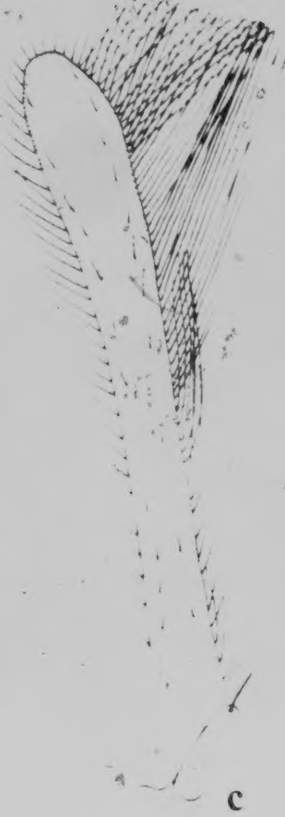
Male macroptera. Head brown, rounded, with few transverse striae (Fig. 11a). Ocelli large. Interocellar setae well developed, slender. Eyes large, with large ommatidia. Postocular setae shorter and stouter than interocellars. Cheek setae slender. Antennal segments slender, elongate; segments I to IV yellow; V to VIII grey; segment IV longer than III, each with sensoria extended entire length of segment; segment III pedicellate (Fig. 11b). Mouthcone rounded (Fig. 11a).

Pronotum brown, smaller than head; major setae developed, slender. Legs slender; femora pale basally and apically, brownish medially; foretibiae yellowish brown; mid and hindtibiae brown; all tarsi yellow. Forewings broad, with 2 dark, brown, cross bands; apex brown; microtrichia developed; anterior and posterior vein setae developed, shaded; posterior fringe cilia straight; scale pale (Fig. 11c). Meso and metascuta brown, with developed median and submedian setae.

Fig. 11. *Franklinothrips rarosae*, n. sp., male holotype. a. Head b. Right antennal segment III. c. Forewing



a



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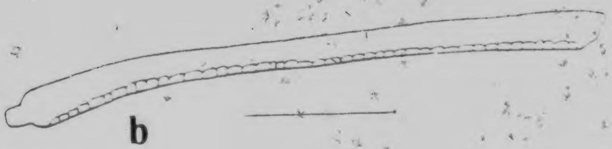


b

Abdomen narrowly attached to thorax . Tergite I narrower than tergite IX; tergites II to VII whitish, slightly shaded with brown medially and laterally; tergites VIII to X brown. B1 and B2 setae of tergite IX well developed but shorter than those on tergite X.

Dimensions (holotype male; um). Body length (extended) 1,992.4. Head length 231.2, median width 275.4; dorsal eye length 176.8; antennal segment lengths: I 40.8; II 52.7; III 391; IV 394.4; V 61.2; VI 42.5; VII 40.8; VIII 47.6; IX 18.7; postocular setae 30.6. Pronotum length 159.8, median width 244.8.

Female macroptera. Similar to male in general color but larger. Antennal segment IV with brown apex. Abdominal tergite I shorter than tergite IX; posterior margin of tergite III distinctly concave; V to VII widened and rounded laterally; B1 and B2 setae of tergite IX longer than those on tergite X.

Dimensions (allotype female; um). Body length (extended) 2203.2. Head length 238, median width 343.4; dorsal eye length 163.2; antennal segment lengths: I 54.4; II 57.8; III 306; IV 224.4; V 88.4; VI 68; VII 57.8; VIII 51; IX 23.8; postocular setae 78.2. Pronotum length 221, median width 350.2.

Type data. **Holotype** male, PHILIPPINES: Visayas: Mt. Pangasugan, Leyte, in Malaise trap, 16 to 20-IX-1983, A. Almeroda (**UPLB**).

Paratypes (1 male, 1 female) same data as holotype (**UPLB**).

Material examined. Type series only (**UPLB**).

Etymology. This species is named after acarologist and aphidologist, Dr. Leonila Corpuz-Raros, who provided the specimens and provided various favors during my collecting trips in Baybay, Leyte.

Distribution (Fig. 13). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Mt. Pangasugan, Leyte.

Host. Almost all known species of *Franklinothrips* are predatory (Stannard, 1952) and most probably this species too.

Genus *Streothrips* Bhatti

Streothrips Bhatti, 1971a: 89.
Type species: *Aeolothrips arorai* Bhatti, by original designation.

Diagnosis. Head broader than long and round to oval. Eyes prolonged ventrally, almost to base of head. Ocelli developed. Postocular setae numerous. Cheeks notched behind eyes. Antennae 9 segmented, inserted on ventral surface of vertex; segments V-IX in form of unit; sensoria on segments III and IV linear, without subdermal ridges. Maxillary palpi 3-segmented; labial palpi 4-segmented.

Pronotum with sculpture of closely placed striae, without long setae. Forefemora slightly enlarged; foretarsi with hook-like tooth ; foretibiae with pair of stout, spine-like setae at apex. Forewings broad with dark cross bands and with pale or brown apices; wing surface with microtrichia. Metanotum with median sculpture of very closely placed striae in form of U-shaped pattern with arms divergent anteriorly. Meso- and metaspinulae present.

Abdomen narrowly attached to thorax; posterior segments broader than anterior segments or not. Tergite IX with long setae, B1 shorter than B2. Sternal accessory setae present or absent. Posteromarginal setae on sternites various in number.

Streothrips species are distinguished from those of *Aeolothrips* by form of median sculpture of the metascutum which has very closely spaced striae having a U-shaped pattern with arms divergent anteriorly. Only 2 species are included in this genus including a new species, *S. alaris*, from the Philippines.

***Streothrips alaris*, n. sp.**
Holotype female, Philippines: Visayas: Guimaras Expt. Sta., Guimaras (**UPLB**).
Figure 12a, b, c, d

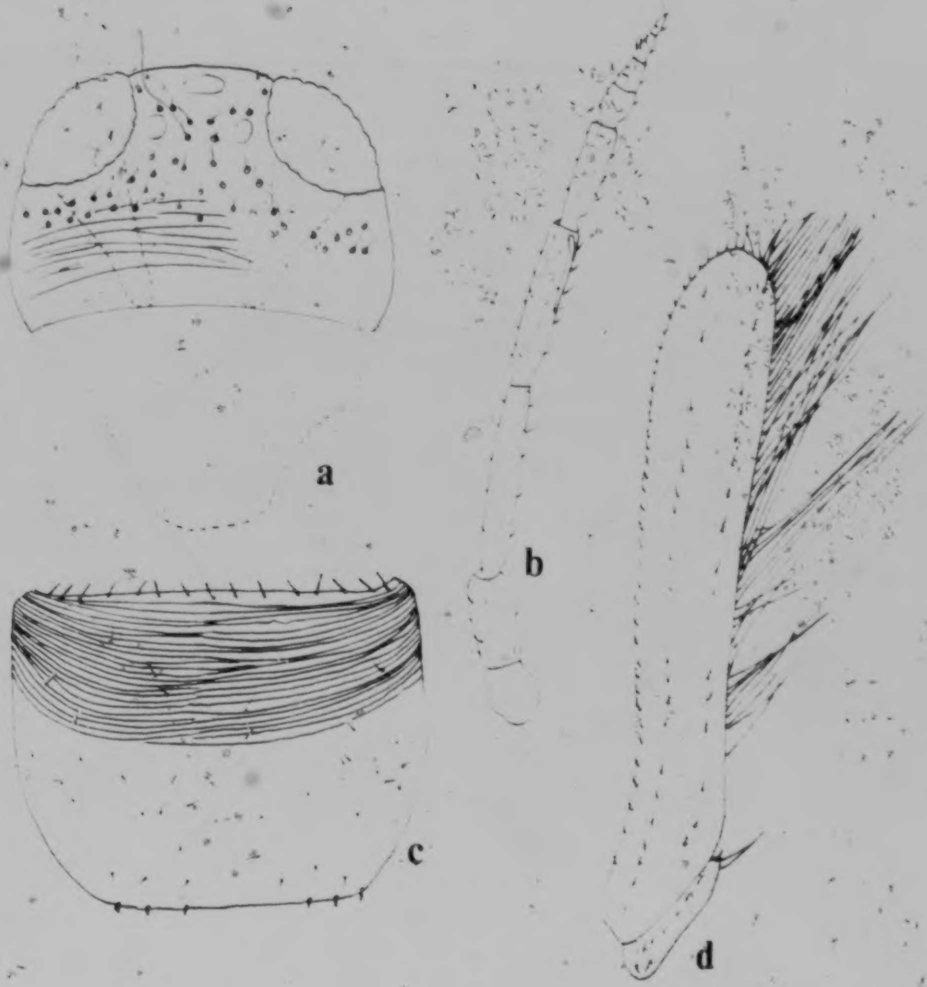
Diagnosis. Body bicolored. Head, thorax, and abdominal tergites I, II and V to X brown; tergites III to IV white; tergite IV shaded with brown medially. Head rounded, with transverse striae. Ocellar and postocular setae numerous. Eyes prolonged ventrally extended to posterior margin. Antennal segment III longer than segment IV. Pronotum transversely striate; anteromarginal setae numerous. Legs bicolored. Forewings brown, whitish basally and medially. Meso and metanota with short, moderately stout setae. Abdomen narrowly attached to thorax. Sternites without accessory setae.

Members of *S. alaris* differ from those of the Indian species, *S. arorai* (Bhatti), in wing color and chaetotaxy, lack of abdominal sternal accessory setae, and in having short, moderately stout setae on meso and metanota.

Female macroptera. Head brown, rounded, with closely spaced transverse striae (Fig. 12a). Ocellar setae numerous. Eyes prolonged ventrally and extended to posterior margin. Postocular setae numerous, of about equal length, slightly longer than ocellars. Cheek setae shorter than postoculars. Antennal segments I to IV whitish; segments V brownish apically; segments VI to IX greyish brown; segments III and IV with linear sense cones; segments III to V slender and elongate; segment III longer than segment IV (Fig. 12b). Mouthcone rounded (Fig. 12a).

Pronotum brown, with closely spaced transverse striae; major setae short and slender, including angulars; anteromarginal setae numerous (Fig. 12c). Femora brown, with small, wedge-like, pale area at apex; forefemora slightly enlarged; foretibiae yellowish brown, with pair of spine-like setae apically; foretarsi yellowish, with hook; midtibiae and all tarsi whitish. Forewings broad, whitish basally and medially; apex brown; anterior and posterior veins with complete row of small setae; anterior fringe cilia absent (Fig. 12d). Meso and metanota with short, moderately stout setae. Mesonotum with closely spaced,

Fig. 12. *Streothrips alaris*, n. sp., female holotype. a. Head b. Right antenna c. Pronotum d. Forewing


a
b
c
d

transverse striae as in pronotum. Metascutal median sculpture of closely spaced striae, in form of U-shaped pattern of divergent arms anteriorly, typical of genus.

Abdomen narrowly attached to thorax. Tergites gradually widened posteriorly. Anterior margin of tergite I indented medially. Tergites I and II light brown. Tergites III to IV white. Tergite IV shaded with brown medially. Tergites V to X brown. B1 and B2 setae of tergite IX dark, subequal, with pointed apices. B1 and B2 setae of tergite X pale. Sternites without accessory setae. Sternites II to VII with 2, 3, 3, 4, 3, and 5 posteromarginal setae respectively.

Dimensions(holotype female; um): Body length (extended) 1931.2. Head length 139.4, median width 238; dorsal eye length 64.6; antennal segment lengths: I 30.6; II 57.8; III 125.8; IV 112.2; V 62.9; VI 25.5; VII 20.4; VIII 17; IX 17. Pronotum length 200.6; median width 272.

Male. Unknown.

Type data. **Holotype** female macroptera, PHILIPPINES: Visayas: Guimaras Experiment Station, Jordan, Guimaras, on *Mangifera indica*, 21-V-1987, C. P. Reyes (**UPLB**).

Material examined. Holotype only (**UPLB**).

Etymology. Alaris is a Latin word meaning "wing" in reference to the forewings of this thrips.

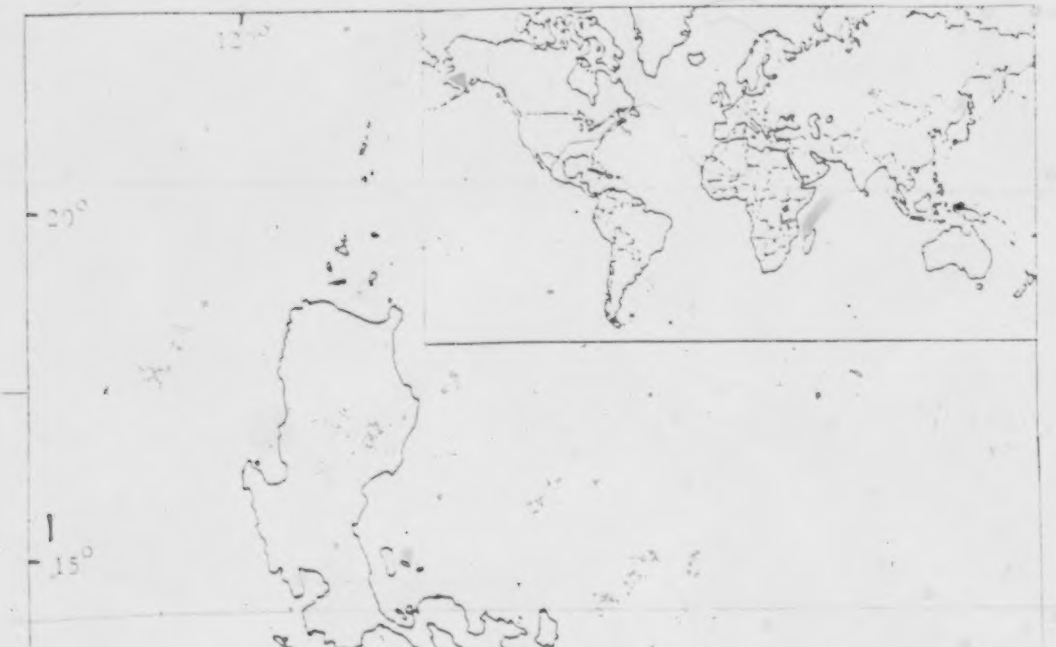
Distribution (Fig. 13). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES. Visayas: Guimaras Experiment Station, Jordan, Guimaras.

Host. Members of *Streothrips* have habits similar to those of *Aeolothrips* (Bhatti, 1971a). Almost all adults and larvae of all *Aeolothrips* are primarily predaceous on other insects (Stannard, 1968).

Fig. 13. Distribution of *Franklinothrips rarosae*, n. sp. and *Streothrips alaris*, n. sp.

● *Franklinothrips rarosae*, n. sp.

▲ *Streothrips alaris*, n. sp.


120°
20°
15°
10°
125°

Family Thripidae Stephens

Thripidae Stephens, 1829: 363

Diagnosis. Head wider than long or longer than wide, with or without net work of raised sculpture. Ocelli present; absent from apterous forms; ocellar area raised or not. Antennae 6- to 9- segmented; terminal segments fused into compact unit or not; style 1 or 2-segmented, extremely long in some taxa; segments III and IV variously shaped; vasiform and pedicellate in some taxa; each with simple or forked sense cone. Maxillary palpi 2-or 3-segmented. Mouthcone short and broad, to narrow and long.

Pronotum with or without network of raised sculpture, major setae small to well developed. Wings fully developed, reduced or absent. Forewings narrow, pointed at apex in most taxa; 2 longitudinal veins and less than 4 cross veins present; anterior vein fused or not to coastal vein beyond basal third; anterior fringe cilia present in most taxa, absent from some taxa. Tarsi 1-or 2-segmented; foretarsi of some taxa without hook-like tooth. Mesospinatemum fused to metasternum or separated by suture.

Abdomen not moderately constricted at base in most taxa. Tergites and pleurites fused or separated by sutures. Tergites with or without specialized sculpture; sigmoidal setae present or absent. Tergite X tapered, asymmetric and tube-like in few taxa. Female ovipositor downturned, well developed or reduced. In males, sternal glandular areas present or absent; genital claspers present or absent. Sternites with or without accessory setae.

The family Thripidae presently includes about 1500 species in 250 genera (Mound and Houston, 1987). Of these, 85 species in 41 genera are here recorded from the Philippines. Although, a number of tribes have been suggested for this family, some of these are not satisfactory and in this paper, the genera are listed alphabetically in each subfamily. Most genera of the suborder Terebrantia are in this family.

Subfamily Panchaetothripinae Bagnall

Panchaetothripinae Bagnall, 1912b: 258.

Diagnosis. Head wider than long, usually with a network of raised scupture; margins sometimes produced into flanges. Ocelli present in a raised ocellar area. Antennae 6-to 8-segmented; surface without microtrichia; segment II enlarged; intermediate segments vasiform, pedicellate; terminal segment or style extremely long. Maxillary palpi usually 2-segmented. Mouthcone short and broad to elongate.

Pronotum usually reticulate; margins produced into flanges; setae small, including those at angles. Wings fully developed, reduced or absent. Forewings with anterior vein fused with costa beyond basal third; anterior fringe cilia absent. Legs reticulate; tarsi 1-or 2- segmented. Mesospinasternum fused with metasternum. Meso and metasternal furcae moderately developed; spinula on each furca absent.

Abdominal tergites and pleurites fused, in few taxa pleural plates present in each segment. Tergites with specialized sculpture of round reticules, porous areas or anastomosing striae, with single pair of sigmoidal wing-retaining setae or single median seta. Tergite X asymmetric, or tubiform and set with long, strong setae. Female ovipositor developed. Sternal glandular areas present in males. Sternites without accessory setae

The subfamily Panchaetothripinae presently includes about 110 species in 33 genera world wide (Mound and Houston, 1987) of these, 17 species in 12 genera are here recorded from the Philippines. All species are regarded as leaf feeders and to be of tropical or subtropical distribution except in greenhouses (Wilson, 1975). The Panchaetothripinae are monographed by Wilson (1975).

Key to genera of the Philippine Panchaetothripinae

1. Antennae 7-segmented, segments III and IV with simple sense cones; tergites smooth with broad, median, longitudinal ridges .... *Phibalothrips* Hood

1' Antennae 8-segmented, segments III and IV with simple or forked sense cones 2

2(1') Head with network of conspicuously raised sculpture; metascutal triangle well-defined; terminal segments of antennae fused or not .... *Astrothrips* Karny

2' Head with or without raised sculpture; metascutal triangle present or absent; terminal segments of antennae distinct 3

3(2') Tarsi 2-segmented; mesoscutum entire 4

3' Tarsi 1-segmented; mesoscutum entire or completely divided 5

4(3) Anterior vein of forewing fused to costal vein, posterior vein located in upper part of forewing (Fig. 19d); pronotum reticulate with moderately long setae; abdominal tergite X tubiform, divided longitudinally on dorsum .... *Panchaetothrips* Bagnall

4' Anterior vein of forewing fused to costa at fork only; pronotum reticulate with lanceolate setae of equal length; abdominal tergite X not tubiform, divided longitudinally on dorsum .... *Copidothrips* Hood

5(3') Mesoscutum entire; metascutum with or without well-defined triangle or with inverted triangular sculpture 8

5' Mesoscutum completely divided; metascutum with inverted triangular sculpture or with sculpture extended posteriorly 6

6(5') Metascutum raised, sculptured and in form of inverted triangle; head and body wrinkled; setae on hind margin of abdominal tergites IX and X short with fan-shaped apices .... *Rhipiphorothrips* Morgan

6' Metascutum with sculpture extended posteriorly over metascutellum; head covered with hexagonal reticules; apical pair of setae on abdominal tergite X with apices expanded 7

7(6') Anterior vein of forewings with dark and bristle-like setae; male with longitudinal, linear, ridge-like glandular area in abdominal sternite VIII ....*Elixothrips* Stannard & Mitri

7' Anterior vein of forewings with small and pale setae (Fig. 18e); male with longitudinal ridge-like glandular area in abdominal sternites VI-VIII (Fig. 18f) ....*Hemingia*, n. gen.

8(5) Occiput of head produced into wide, concave collar (Fig. 16a); metafurca enlarged, lyre-shaped; abdominal tergites with antecostal lines heavily sclerotized, in form of large scallop-like areas posteriorly .... *Helionothrips* Bagnall

8' Occiput of head not produced, at most head slightly depressed into pseudocollar posteriorly; metafurca lyre-shaped or normal 9

9(8') Metafurca lyre-shaped; abdominal tergites II to VII with polygonal reticulations or transverse striations on lateral thirds; mesopraesternum with post process long, thick and transversely expanded at apex .... *Caliothrips* Daniel

9' Metafurca normal; abdominal tergites with varied reticulation 10

10(9') Antennal segments III and IV with forked sense cones; head slightly depressed into pseudocollar posteriorly; hind margin of abdominal tergite VIII with complete comb of long teeth .... *Selenothrips* Karny

10' Antennal segments III and IV with simple sense cones; head with or without definite transverse constriction posteriorly 11

11(10') Forewings with large callosities between costa and anterior vein; pterothorax and abdomen unusually broad; body covered with reticulations .... *Retithrips* Marchal

11' Forewings medium-sized without callosities; pterothorax and abdomen normal; body covered with reticulations except for pair of posterior, submedian, smooth areas on abdominal tergites .... *Heliothrips* Holiday

Genus *Astrothrips* Karny

Astrothrips Karny, 1921: 215-239.
Type species: *Heliothrips globiceps* Karny, by subsequent designation of Moulton, 1932.

Diagnosis. Head with raised sculpture, posterior dorsal collar with transverse series of large reticules, setae small. Ocellar hump variously produced. Antennae 8-segmented, terminal segments fused, resulting in apparently 5-7-segmented antennae; segments lacking microtrichia; sense cones on segments III and IV usually simple, occasionally forked. Maxillary palpi 2-segmented.

Pronotum with anterior half with raised sculpture; submarginal transverse apodeme bordered posteriorly by a margin of raised sculpture present or absent in some species, posterior half with or without raised sculpture. Tibiae with 2 thick spurs at apex; tarsi 1-segmented. Forewings slender, veins distinct, with long setae with pointed apices; anterior fringe cilia longer than costal setae; posterior fringe cilia wavy; apex of wing moderately rounded. Mesoscutum notched on anterior and posterior margins, never completely divided. Metascutal triangle usually well formed. Post process of mesopraesternum long and transversely forked at apex.

Abdominal tergite I reticulate; sculpture extending beyond posterior margin; tergite II constricted, waist-like at base, smooth medially and laterally with cuticular processes in the form of pointed ridges, stalked microtrichia, or wart-like tubercles; tergites III-VII each with antecostal line with small, longitudinal thickening sublaterally; posterior tergites with or without sigmoidal or wing retaining setae. Posterior margin of tergite VIII with out complete comb of microtrichia; tergite X completely divided longitudinally.

Males similar to female but smaller. The form of sense cones on antennal segments III and IV occasionally differ in males. The sternites of males have U- or V-shaped glandular areas that are absent in members of some taxa. The genus *Astrothrips* was reviewed by Stannard and Mitri (1962), Bhatti (1968) and Wilson (1975) and includes about 10 species of which 3 are known from the Philippines. *Astrothrips* spp. resemble those of *Elixothrips*, *Hemingia* n. gen. and *Copidothrips* in having trichoid processes on abdominal tergite II and asymmetric abdominal tergite X.

Key to Philippine species of *Astrothrips* Karny

1. Pronotum without transverse submarginal apodeme; metascutal sculpture deeply notched medially; antennal segments V-VII formed into round, compact unit .... *A. tumiceps* Karny

1'. Pronotum with transverse submarginal apodeme bordered by raised sculpture; metascutal sculpture shallowly notched medially; antennal segments V-VII elongate 2

2(1') Metascutal triangle with thick, median, longitudinal, ridge extending posteriorly to middle of metascutellum; reticules on lateral abdominal tergites smooth .... *A. aucubae* Kurosawa

2'. Metascutum without median ridge; reticules on lateral abdominal tergites with numerous internal wrinkles .... *A. globiceps* (Karny)

Astrothrips aucubae Kurosawa
Astrothrips aucubae Kurosawa, 1932: 230.
Holotype female, Japan: Mt. Takao (**Kurosawa**) [not examined]
Astrothrips aucubae Kurosawa; Wilson, 1975: 46-47.

Diagnosis. Body dark brown. Head and pronotum with raised hexagonal reticulations. Ocellar hump enlarged. Antennal segments yellowish with brown margins; segments VI and VII closely joined. Forelegs golden. Forewings with 2 brown cross bands; apex pale; veins with strong dark setae. Mesoscutal sculpture shallowly notched anteriorly and posteriorly. Metascutal median sculpture in form of distinct triangle with median thick longitudinal ridge reaching metascutellum. Abdominal tergites III to VIII smooth medially, reticulate laterally. Tergite X with B1 setae pale, blunt at apex.

Wilson (1975) redescribed this species and illustrated the antenna, meso and metanota, forewing, and abdominal tergites IX and X.

Female macroptera. Head wider than long, slightly constricted at base; covered with raised hexagonal sculpture, with large reticules in form of transverse row medially. Ocellar hump enlarged, produced between bases of antennae. Ocellar setae minute. Antennae yellowish, faintly shaded on lateral margins; segment III elongate; segments III and IV each with simple sense cone; segment VI closely joined to segment VII, with distinct suture. Mouthcone broadly rounded.

Pronotum about 2 times as wide as long; hexagonally sculptured; raised sculpture confined to anterior half and posterolateral quarter; midlateral setae about as long as submedian discal setae. Forelegs golden; mid and hindfemora brown with pale bases; tibiae pale basally and apically, brown medially; tarsi yellowish. Forewings with 2 brown cross bands; apex pale; anterior and posterior veins with complete row of well developed, dark setae; posterior fringe cilia wavy. Mesoscutal sculpture shallowly notched anteriorly and posteriorly along midline; median setae well developed. Metascutal median sculpture in form of distinct triangle; median longitudinal ridge reaching metascutellum. Metascutellum smooth, with few striae laterally.

Abdominal tergite I hexagonally reticulate; posterior reticules extending to tergite II in form of longitudinal ridges. Tergite II with trichoid-like processes on lateral half. Tergites III to VIII smooth medially, hexagonally reticulate laterally. Tergites IX and X reticulate. Tergite X asymmetric; B1 setae pale, slightly curved and blunt at apex.

Male. Males of this species are rare in nature. I was not able to examine the damaged and only male specimen reported in the literature (Wilson, 1975). Not known in the Philippines.

Material examined. 2 females, Mlang, North Cotabato, host unknown, 16-V-1987, C. P. Reyes (**CPRC**); 1 female, Philippines, taken in quarantine at Honolulu, on Orchidaceae, 9-IX-1966 (**USNM**).

Distribution (Fig. 14). The known range of this species extends from Japan to the Philippine Archipelago. In the Philippines, this species is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: Manila, taken in quarantine at Honolulu, Hawaii; Mindanao: Mlang, North Cotabato. JAPAN: Tokyo.

Hosts. Orchidaceae, *Aucuba japonica*,*Thalictrum minus*, *Thalictrum aquilegifolium*

Astrothrips globiceps Karny
Heliothrips globiceps Karny, 1913a: 125.
Holotype female, New Britain: Ralum (**SMFG**) [examined]
Astrothrips globiceps (Karny); Kudo, 1980: 345-346.

Diagnosis. Body dark brown. Head and pronotum with raised hexagonal reticulations. Ocellar hump moderately enlarged. Antennal segments yellowish; segment III elongate, tubular in basal third and at apex; suture between segments VI and VII partial and ventral. Forefemora yellowish with brownish margins; foretibiae shaded with light brown on basal half; tarsi yellow. Forewings with 2 brown cross bands; apex pale; veins with dark, strong setae. Mesoscutal sculpture shallowly notched anteriorly and posteriorly. Metascutal median sculpture in form of distinct triangle, uniformly reticulate. Abdominal tergites III to VIII smooth medially, reticulate laterally. Tergite X with B1 setae pale, blunt at apex.

A. globiceps is distinctive in the shape of antennae and in having partial and ventral suture between antennal segments VI and VII. Wilson (1975) redescribed this species with figures of antenna, meso and metanota, endothoracic structures, forewing, and abdominal tergites IX and X. The male of this species was described for the first time by Kudo (1980).

Female macroptera. Head slightly constricted at base; entirely covered with raised hexagonal sculpture, median reticules large. Ocellar hump moderately enlarged, produced between bases of antennae. Ocellar setae minute. Antennae yellowish; suture between morphological segments VI and VII partial and ventral; segments III and IV with simple sense cones; segment III elongate, tubular in basal third and at apex. Mouthcone broadly rounded.

Pronotum less than 2 times as long as wide; hexagonally reticulate; raised hexagonal reticulation confined anteriorly and posterolaterally; midlateral setae about as long as submedian discal setae. Forefemora yellowish, margins brownish; foretibiae shaded with light brown on basal half; all tarsi yellowish; mid and hindfemora brown with pale bases; midtibiae brown on basal third; yellow on extreme base and apical two-thirds; hindtibiae yellowish, shaded with light brown near base. Forewings with 2 brown cross bands; apex pale; anterior and posterior veins with strong, dark setae. Mesoscutal sculpture shallowly notched anteriorly and posteriorly along midline. Metascutal median sculpture in form of distinct triangle, uniformly reticulate. Metascutellum smooth.

Abdominal tergite I hexagonally reticulate; posterior reticules with longitudinal ridges extended to tergite II. Tergite II with trichoid-like processes on lateral half. Tergites III to VIII smooth medially, reticulate laterally. Tergites IX and X reticulate. Tergite X asymmetric; B1 setae pale, blunt at apex.

Male macroptera. Similar to female in structure and color. Abdominal tergite IX with transverse row of 3 pairs of median, spine-like setae of subequal length, outer pair placed slightly posterior to inner pair. Abdominal sternites IV to VII each with a U-shaped glandular area, with arms facing anteriorly.

Materials examined. 1 female, BFD Brooks Point, Palawan, on *Portulaca pilosa*, 29-I-1985, C. P .Reyes; 2 females, VISCA campus, Baybay, Leyte, on unknown grass, 13-V-1987, C. P .Reyes; 1 female, Sipit Saburan, Puerto Gallera, Oriental Mindoro, on Malvaceae, 19-IV- 1987, C. P. Reyes; 1 female, Sagpangan, Agko, Mt. Apo, on flower of everlasting, 5-V-1987, C. P.Reyes; 1 female, Mlang, North Cotabato, on *Plumiera acutifolia*, 11-V-1987, C. P. Reyes; 7 females, Mlang, North Cotabato, on leaves of *Crinium asiaticum*, 11-V-1987, L. M. Abecia (**CPRC**).

Distribution (Fig. 14). The known range of this species extends from India eastward in Southeast Asia to the Pacific Islands. In the Philippine archipelago, this species is known from the the four principal zoogeographic regions, on the islands of Luzon, Palawan, Visayas and Mindanao. PHILIPPINES. Luzon: San Pablo City; Palawan: BFD, Brooks Point; Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro; VISCA, Baybay, Leyte; Mindanao: Mlang, North Cotabato; Sagpangan, Agko, Mt. Apo. MALAYSIA.

THAILAND. BURMA. INDIA. NEW BRITAIN. PONAPE IS. MICRONESIA. COLONIA. SAIPAN IS. JAPAN.

Hosts. - grass, *Portulaca pilosa*, unknown grass, Malvaceae, flower of everlasting, *Plumiera acutifolia*, leaves of *Crinium asiaticum*, beating vegetation, leaves of *Calocasia* sp., dry leaves, dry vines, twigs

Astrothrips tumiceps Karny
Astrothrips tumiceps Karny, 1923: 331.
Holotype female, Indonesia: Java: Banjoewang (**SMFG**) [examined]
Tryphactothrips rutherfordi Bagnall **partim** Moulton, 1936: 263-264.

Diagnosis. Body dark brown. Head and pronotum with raised hexagonal reticulations. Antennal segments yellowish; segments V to VIII united into compact unit. Pronotum without submarginal transverse apodeme. Forefemora and foretibiae golden, with darker lateral margins. Forewings with 2 brown cross bands; apex pale; veins with strong, dark setae. Mesoscutum deeply notched anteriorly and posteriorly. Metascutal sculpture formed as distinct triangle, reticulate. Abdominal tergite X with B1 setae pale, blunt at apex.

This species is interesting since the 2 sexes have differing sense cones on antennal segment III and IV, simple in the female and forked in the male.

Female macroptera. Head wider than long; hexagonally reticulate; raised hexagonal sculpture confined to anterior half and lateral margins; median reticules arranged in transverse row. Ocellar hump enlarged, produced between bases of antennae. Ocellar setae small. Antennae yellowish; morphological segments V to VIII united into compact unit; segments IV and V globose; segments III and IV with simple sense cones. Mouthcone broadly rounded.

Pronotum hexagonally reticulate, with raised hexagonal sculpture on anterior half, posterior quarter and on lateral margins; submarginal transverse apodeme absent; discal setae developed. Forefemora and foretibiae golden, inner and outer margins darker; all tarsi yellowish. Forewings with 2 brown cross bands; apex pale; anterior and posterior veins with dark, well developed setae. Mesoscutal sculpture deeply notched anteriorly and posteriorly along midline, median, intact portion less than length of posterior notch. Metascutal median sculpture in form of distinct triangle; reticulate. Metascutellum smooth. Abdominal tergite I hexagonally reticulate; posterior reticules with longitudinal ridges extending to tergite II. Tergite II with trichoid-like processes on lateral half. Tergites III to

VIII smooth medially, reticulate laterally. Tergite IX and X reticulate. Tergite X with B1 setae pale, blunt at apex.

Male macroptera. Similar to female in structure. Antennal segments III and IV with forked sense cones; segments VI and VII dark brown. Abdominal tergites light yellow. Tergite IX with transverse row of 3 pairs of median spine-like setae of equal length. Abdominal sternites without glandular areas.

Material examined. 7 females, Visayas: Victorias, Negros Occidental, on *Gossypium brasiliense* July 16,1928, W. D. Pierce; Los Banos, Laguna, on pink flowering cotton (*Gossypium* sp.) plant, July 9,1931, Laguna, on a legume, October 20,1931, I. D. Dobrosky (Moulton Coll.) (**CASC**); 11 females, La Granja, La Carlota, Negros Occidental, on leaves of *Ricinus communis*, 26-V-1987, C. P. Reyes; 1 female, Bagontapay, Mlang, North Cotabato, on leaves of *Ricinus communis*, 10-V-1987, D. Panaligan (**CPRC**).

Distribution (Fig. 14). The known range of this species extends from India eastward in Southeast Asia to the Indonesia Archipelago. In the Philippine Archipelago, this species is known from the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: Los Banos, [Laguna]; Laguna; Visayas: Victorias, Negros Occidental; La Granja, La Carlota, Negros Occidental; Mindanao: Bagontapay, Mlang, North Cotabato. INDONESIA: Java. INDIA. PAKISTAN. THAILAND. MALAYSIA. BURMA. JAPAN.

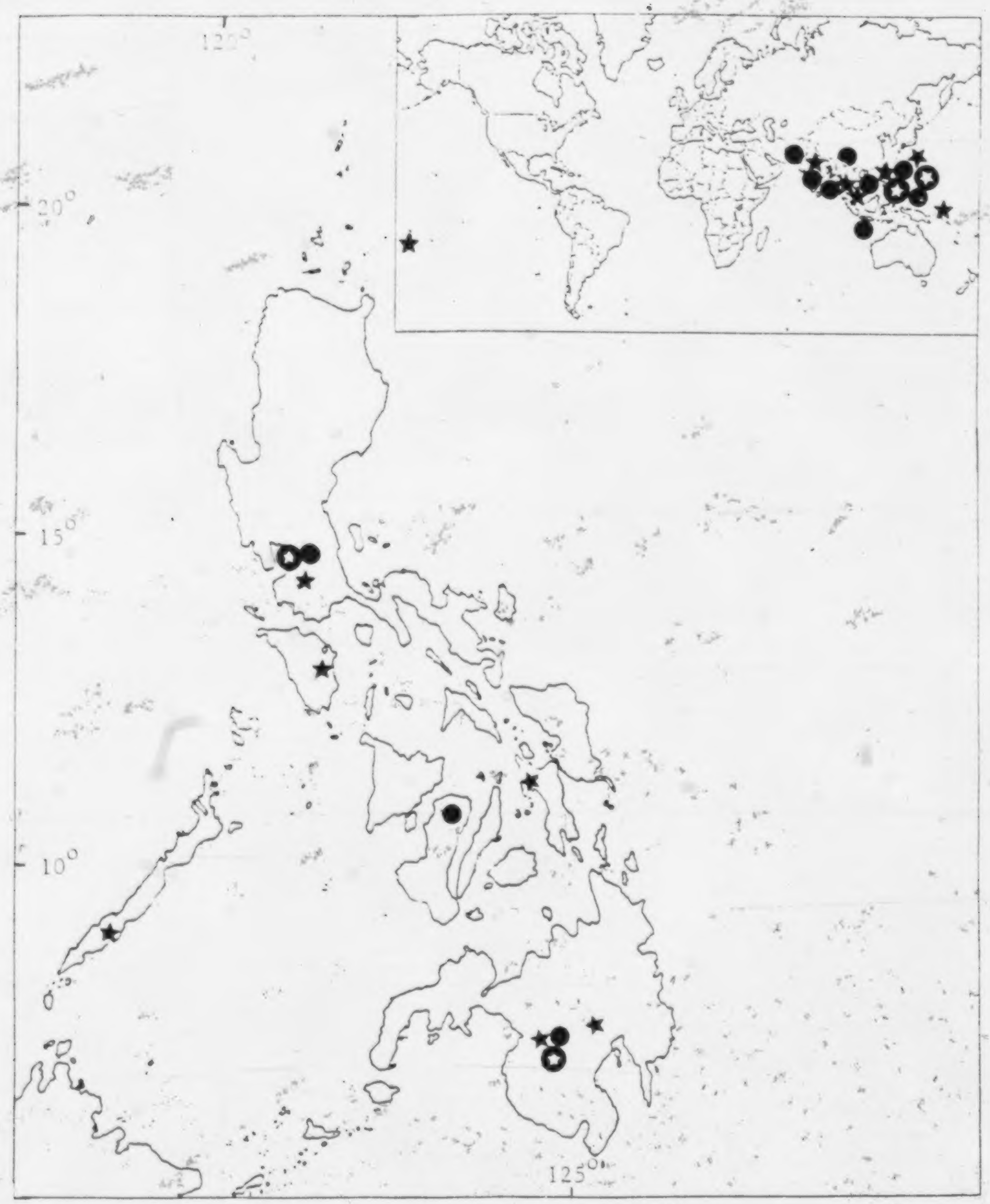
Hosts. Adults of *A. tumiceps* were found feeding on upper and undersurfaces of the leaves of *Ricinus communis* in La Granja, Negros Occidental. This species is also common on the undersurface of the leaves of the same plant during the hot, dry months in central India and during all seasons in southern India (Wilson, 1975). Other host plants include:*Gossypium brasiliense*, *Gossypium* sp., legume, leaves of lima bean, leaves of *Dolichos lablab*, leaves of *Canna*, bread fruit, leaves of *Glycine max*, *Erythrina* leaves, ferns, grasses, *Lantana* sp., dry leaves

Fig. 14. Distribution of *Astrothrips* species in the Philippines, and world.

✪ *A. aucubae* Kurosawa

★ *A. globiceps* Karny

● *A. tumiceps* Karny


120°
20°
15°
10°
125°

Genus *Caliothrips* Daniel

Caliothrips Daniel,1904:296.
Type species: *Caliothrips woodworthi* Daniel a synonym of *Heliothrips fasciata* Pergande, by monotypy.

Diagnosis. Head polygonally reticulate, reticules with internal vermiform wrinkles, without raised sculpture; occiput with transverse, posterior marginal band of smooth reticules, usually with scattered dot-like thickenings; cheeks parallel or slightly constricted toward base. Ocelli well developed on slightly elevated median hump. Antennae 8-segmented; segments III and IV each with a forked sense cone; ventral surfaces of segments IV-VI with microtrichia. Maxillary palpi 2-segmented.

Pronotum polygonally reticulate as in head, reticules with internal vermiform wrinkles, or with dot-like thickenings; setae moderately developed, hyaline, equal in length. Hindcoxae large, closely placed; tarsi 1-segmented. Forewings with dark cross bands, apex pointed; anterior and posterior fringe cilia present; veins lacking complete row of setae; venal setae often strong and dark. Mesoscutal sculpture entire; postprocess of mesopraesternum long, thick, with apex transversely expanded. Metafurca enlarged, lyre-shaped; metascutum completely reticulated, lacking sculpture of median triangle; metascutellum distinct, transverse and medially reticulated.

Abdominal tergites II-VII each with polygonal reticulations, or with transverse striations in lateral thirds, smooth, or with vermiform wrinkles within reticules and between striae; median third of tergites usually smooth, occasionally reticulate across anterior third; tergites II-VIII with hind margin having regularly toothed, fish-fin, comb on lateral thirds, median third of comb with lobate margin. Tergite X entire, completely divided longitudinally in few taxa. Male with broadly transverse, arcuate, oblong, circular or dot-like sternal glandular areas; tergite IX with 3 pairs of prominent setae. Sternites transversely reticulate, with 3 pairs of widely spaced setae positioned at junction of sternite and posterior flange in females, midway between sternal glandular areas and posterior flanges in males.

Caliothrips species are brown to black with banded forewings. This genus has a world-wide distribution and includes 19 species (Mound and Houston, 1987). Several are crop pests in the tropics. One species *C. striatopterus* is known from the Philippines.

***Caliothrips striatopterus* (Kobus)**
Thrips striatoptera Kobus, 1893: 589,590.
Type unknown, Indonesia: Java (**Unknown**) [not examined]
Caliothrips striatopterus (Kobus); Capco, 1957:13

Diagnosis. Body dark brown. Head and thorax reticulate, most reticulations with internal wrinkles. Ocellar hump small. Antennae bicolored. Femora brown with pale apex; tibiae yellow in apical third; tarsi yellow. Forewings with broad brown cross band; base pale, apex dark; veinal setae strong, dark. Mesonotum reticulate medially; reticules with internal wrinkles; anterior median quarter smooth. Metascutum reticulate; reticules with internal wrinkles; lateral reticules larger. Abdominal pleurites, lateral quarter of tergites and sternites covered with anastomosed striae.

Males of C. *striatopterus* are important in species recognition since females of related species of *Caliothrips* are similar in structure. Wilson (1975) redescribed this species with figures of abdominal tergite IX and sternite IV of male.

Female macroptera. Head wider than long; sculpture of reticules with internal wrinkles; posterior margin with transverse row of large reticules without internal wrinkles. Ocellar hump small. Ocellar setae developed. Antennal segments I and II brown; base of I pale; segments III to VIII yellowish to whitish, faintly shaded apically; III and IV each with a simple sense cone. Mouthcone elongate, narrowly rounded.

Pronotum completely reticulate; reticules with internal wrinkles; discal setae developed. Femora brown; base and apex pale; tibiae brown in basal two-thirds, yellow in apical third; extreme base pale; tarsi yellow. Forewings with broad brown cross band; apex dark; anterior and posterior vein setae developed, dark, slightly curved toward posterior margin of wing; posterior fringe cilia brownish, wavy. Mesonotum smooth on anterior median quarter; reticulate medially; reticules with internal wrinkles; posterior median quarter with transverse striae coming together medially. Metascutum reticulate; reticules with internal wrinkles; lateral reticules larger. Metascutellum with large reticules.

Abdominal pleurites, lateral quarter of tergites and sternites covered with anastomosing striae. Median half of tergite I with distinct reticules. Tergites II to VIII nearly smooth medially; posterior margin with comb of microtrichia. Tergite IX and X reticulate. B1 setae on tergite IX pale, each borne on tubercle.

Male macroptera. Color and structure similar to female. B1 setae of abdominal tergite IX stout, thorn-like; B2 setae slightly weaker than B1; B3 slender, spine-like. Sternites III to VII each with large, transverse glandular area.

Material examined. 1 female, Gaggabutan Forest, Rizal, Cagayan, on leaves of Curran's Lipote, 29-III-1977, L. C. Raros; 1 male, Goa, Camarines Sur, on *Ageratum*, 3-VI-1987, C. P. Reyes; 1 female, Pina, Guimaras, on *Cucurbita maxima*, 22-V-1987, C. P. Reyes; 1 female, Malungon, South Cotabato, unknown, 25-II-1985, C. P. Reyes; 3 females, 6 males, Agko, Mt. Apo, on *Calocasia esculenta*, 3-V-1987, C. P.R eyes; 10 females, 6 males, Sagpangan, Agko, Mt. Apo, on flower of everlasting, 5-V-1987, C. P. Reyes; 9 females, 4 males, Agko, Mt. Apo, on *Zea mays*, 3-V-1987, C. P. Reyes; 4 females, 4 males, Mlang, North Cotabato, on leaves of *Calocasia esculentum*, 17-II-1985, C. P. Reyes; 7 females, 8 males, Mlang, North Cotabato, on *Calocasia* sp., 11-V-1987, C. P. Reyes (**CPRC**). 1 female, Esperanza, Koronadal, South Cotabato, on *Zea mays* seedling, 19-VI-1985, A. Barrion; 8 females, Bo.7 Koronadal, South Cotabato, on *Zea mays* seedlings, 4-VI-1985, A. Barrion (**IRRI**).

Distribution (Fig. 15). The known range of this species extends from India eastward in the Indonesian Archipelago to Australia. In the Philippine Archipelago, this species is known from the three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: Gaggabutan Forest; Rizal, Cagayan; Goa, Camarines Sur; Visayas: Pina, Guimaras; Mindanao: Mlang, North Cotabato; Malungon,South Cotabato; Esperanza, Koronadal, South Cotabato; Bo. 7, Koronadal, South Cotabato; Agko, Mt. Apo. INDIA. INDONESIA: Java. AUSTRALIA: Queensland.

Hosts. This species infests sugarcane plants in the Philippines (Capco, 1957) and injuring leaves of sugarcane and maize in Java, Indonesia (Wilson, 1975). This species was also collected from the the following: leaves of Curran's Lipote, *Ageratum*, *Cucurbita maxima*, *Calocasia esculentum*, *Calocasia* sp., flower of everlasting, *Zea mays* seedlings, *Rhynchelytrum repens*.

Genus *Copidothrips* Hood
Copidothrips Hood,1954: 188-190.
Type species: *Copidothrips formosus* Hood by original designation.

Diagnosis. Head without distinct, broad collar; raised sculpture confined to small, ocellar hump. Cheeks slightly convex, constricted towards base. Antennae 8-segmented; segments III and IV each with a simple sense cone; segments V-VI with microtrichia. Maxillary palpi 2-segmented.

Pronotum transverse, reticulate, lacking raised sculpture and with lanceolate setae of equal lengths. Tarsi 2-segmented. Forewings with anterior vein fused to costal vein; costal setae longer than anterior fringe cilia; microtrichia of equal lengths; all veins with complete row of well developed setae. Mesoscutum entire on anterior margin. Metascutum lacking median sculpture of distinct triangle, with pair of anterior, lanceolate setae.

Abdominal tergite II constricted at base, waist-like, with dense mat of trichoid cuticular processes laterally. Tergites III-VII each with transverse striations on anterior half, smooth on posterior half, reticulate laterally, lacking sculpture of round areolae. Hind margin of tergite VIII without comb of microtrichia. Tergite X long, slightly asymmetrical; with long, pointed setae. Sternites III-VIII with antecostal line posteriorly concave in middle.

Copidothrips is a monobasic genus known from Taiwan, Japan, India and the Philippines. Adults of the single species included in this genus resemble those of *Astrothrips* spp., *Hemingia* n. gen. spp. and *Elixothrips* *spp.* in having trichoid cuticular processes on abdominal tergite II and asymmetric tergite X. They differ from members of these 3 genera in not having triangular sculpture on the metascutum, forewings with longer setae, anterior vein of forewing fused to costal vein, and head and thoracic setae lanceolate.

Copidothrips formosus Hood
Copidothrips formosus Hood, 1954:188-193.
Holotype female, Taiwan: Rarasen (USNM) [examined]

Diagnosis. Body brown. Head and pronotum hexagonally reticulate; reticules smooth. Ocellar area with raised sculpture. Ocellar hump small. Antennae bicolored; segment VIII elongate. Forelegs yellow. Forewings with 2 brown cross bands; apex pale; vein setae spine-like. Mesoscutal sculpture entire or shallowly notched posteriorly. Metascutal median sculpture not formed as distinct triangle. Tergites III to VII with transverse striae anteriorly; hexagonally reticulate laterally. B1 setae of tergite IX and X well developed, pale, nearly pointed at apex.

This is the first record of *C. formosus* in the Philippines. Kudo (1973) and Wilson (1975) redescribed this species and both illustrated the head, pronotum and antenna.

Female macroptera. Head wider than long, slightly constricted at base, hexagonally reticulate, reticules smooth; posterior reticules elongate. Ocellar area with raised sculpture. Ocellar hump small. Ocellar setae minute. Cheeks slightly convex, indented behind eyes. Postocular setae pair I, III, and IV strong, lanceolate; pair II minute. Antennae bicolored; segments III and IV yellow, elongate, with simple sense cones; segment VIII elongate, about 2.0 times as long as segment VII. Mouthcone elongate, rounded.

Pronotum wider than long; covered with hexagonal reticulations; posterior transverse apodeme with smooth border; discal setae lanceolate, numerous, subequal in length. Forelegs yellow. Forewings with 2 brown cross bands; apex pale; surface of wing with long microtrichia; costal setae much longer than anterior fringe cilia; anterior and posterior veins with complete row of long, dark, spine-like setae. Mesoscutal sculpture entire. Metascutal median sculpture not in form of distinct triangle; anterolateral setae lanceolate. Metascutellum narrow, broadly transverse, smooth.

Abdominal tergite I smooth, with few weak transverse striae. Tergite II with trichoid cuticular processes laterally. Tergites III to VII with transverse striae anteriorly;

hexagonally reticulate laterally. Tergites IX and X reticulate, each with developed B1 setae, nearly pointed at apex.

Male. Unknown

Material examined. 1 female, Anuling, Pamocotan, Zamboanga, on Compositae, 11-VII-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 15). The known range of this species extends from India eastward in Japan to the Pacific Islands. In the Philippine Archipelago, this species is known from the island of Mindanao. PHILIPPINES: Mindanao: Anuling, Pamocotan, Zamboanga. TAIWAN. JAPAN. INDIA. GILBERT IS. SINGAPORE. MICRONESIA.

Hosts. on Compositae, orchid, iris, *Capparis* sp., in soil

Genus *Elixothrips* Stannard and Mitri

Elixothrips Stannard and Mitri, 1962: 202-203.
Type species: *Tryphactothrips brevisetis* Bagnall, by original designation

Diagnosis. Head with raised sculpture anteriorly, surface covered by uniform, large, hexagonal reticules; posterior collar absent. Ocellar hump small. Postocular setae small, pair IV well developed. Antennae 8-segmented; segments III and IV each with simple a sense cone; segments IV-VI with microtrichia. Maxillary palpi 2-segmented.

Pronotum transverse, completely reticulate, with small setae. Tarsi 1-segmented. Forewings with bold veins; venal setae strong, irregularly placed; anterior fringe cilia longer than costal setae; posterior fringe cilia wavy; anterior vein fused to costa at fork of veins, microtrichia equal in length. Mesoscutum completely divided. Metascutum with sculpture extended posteriorly over metascutellum.

Abdominal tergite I lacking flange of sculpture on hind margin; tergite II with dense mat of trichoid processes in lateral thirds. Tergites III-VII with long transverse striations on anterior median half, with reticulations laterally. Tergite VIII lacking comb of microtrichia on posterior margin. Tergite X asymmetric, completely divided longitudinally and with apical pair of setae expanded apically. Antecostal line on sternites IV-VII posteriorly concave medially.

Elixothrips is a monobasic genus females of which possess an asymmetric tergite X with a pair of apical setae with expanded apices as do members of *Hemingia* n. gen. This genus was described by Stannard and Mitri (1962) based on female specimens, and the first male was described by Kudo (1980) from the Philippines. *Elixothrips* adults are easily distinguished from members of *Hemingia* n. gen. by their strong, dark, venal setae on the forewings, and by the shape and number of abdominal sternal glandular areas in males: these are small and circular on sternite VI, short and transverse on sternite VII, and on sternite VIII nearly U-shaped and medially separated glandular areas. *Hemingia* n. gen.

males have a pair of longitudinal, linear, ridge-like glandular areas on abdominal sternites VI-VIII.

Elixothrips brevisetis (Bagnall)
T [*ryphactothrips*] *brevisetis* Bagnall, 1919: 257.
Holotype female, Seychelles: Cascade, Mahe (TMNH) [examined]
Tryphactothrips rutherfordi Bagnall **partim** Moulton, 1936: 263-264.

Diagnosis. Body brown with darker thoracic lateral margins. Head and pronotum hexagonally reticulate; reticules smooth. Ocellar hump small. Cheeks constricted behind eyes. Antennae bicolored; segment III pedicellate. Forelegs golden. Forewings shaded with brown and with subbasal and median white patches; apex pale. Mesoscutal sculpture completely divided longitudinally. Metascutal median sculpture in form of moderately distinct triangle. Abdominal tergites III to VII reticulate laterally, smooth on posterior median half, striate on anterior half. B1 setae of tergite X pale, stout and expanded at apex.

This species was described by Bagnall (1919) and Okajima (1979c) based on female specimens. Kudo (1980) reported and described the first known male of *E. brevisetis* on bamboo plant from the Philippines.

Female macroptera. Head wider than long, constricted at base; sculpture of unraised hexagonal reticulation; reticules smooth. Ocellar hump small. Postocular setae reduced. Cheeks constricted just behind eyes, subparallel on margins. Antennal segments I and II brownish yellow; III to V yellow; VI to VIII yellowish brown; segment III pedicellate and III and IV each with simple sense cone. Mouthcone broadly rounded.

Pronotum hexagonally reticulate; anterolateral angles with raised sculpture; posteromarginal transverse apodeme produced, with smooth border; discal setae minute. Forelegs golden; mid and hindfemora dark brown; apical third of all tibiae yellowish brown; tarsi yellow. Forewings brown, with subbasal and median white patches; apex pale; anterior vein fused to costa at fork of veins, setae dark, about half as long as median width of forewing; posterior fringe cilia wavy. Mesoscutal sculpture completely divided along longitudinal midline. Metascutal median sculpture formed as moderately distinct triangle, extended past hind margin of metascutellum. Metascutellum smooth.

Abdominal tergite I smooth; II smooth medially, with dense mat of stout, trichoid processes laterally. Tergites III to VII reticulate laterally, smooth on posterior median half, weakly striate on anterior half; median setae minute. Tergites VII and VIII with pair of sigmoidal, lateral setae. Posterior margin of tergite VIII without comb of microtrichia. Tergite X reticulate; B1 setae pale, stout, expanded at apex. Posterior antecostal line of sternite IV to VII concave medially.

Male macroptera. Similar to female in structure. Abdominal tergite IX with a pair of long posterolateral setae, expanded at apex. Posteromarginal setae of abdominal sternites in 3 pairs, placed anteriad posterior margin. Sternite VI with small, circular glandular area. Sternite VII with transversely circular glandular area. Sternite VIII with U-shaped, medially separated glandular area.

Material examined. 1 female, Victorias, Negros Occidental, on *Canna speciosa*, 14-III-1919, W. D. Pierce (Moulton Coll.) (**CASC**). 2 females, 1 male, Mudspring, Mt. Makiling, Laguna, on leaves of *Musa sapientum*, 27-VI- 1987, C. P. Reyes; 3 females, Bicol Expt. Sta., Pili, Camarines Sur, on *Ficus* sp., on leaves of vine with galls, on leaves of *Ficus* sp., 5-VI-1987, C. P. Reyes; 1 female, Bicol Expt. Sta., Pili, Camarines Sur, on leaves of *Codiaeum variegatum*, 4-VI-1987, C. P. Reyes; 1 female, BFD, Brooks Point, Palawan, on *Portulaca pilosa*, 29-I-1985, C. P. Reyes; 1 female, Anuling, Pamocotan, Zamboanga, on Compositae, 11-VII-1987, C. P. Reyes; 3 females, FORI, Camp Susana, La Paz, Zamboanga, host unknown, 12-VII-1987, C. P. Reyes; 1 female, Agko, Mt. Apo, "million flower", 5-V-1987, C. P. Reyes (**CPRC**).

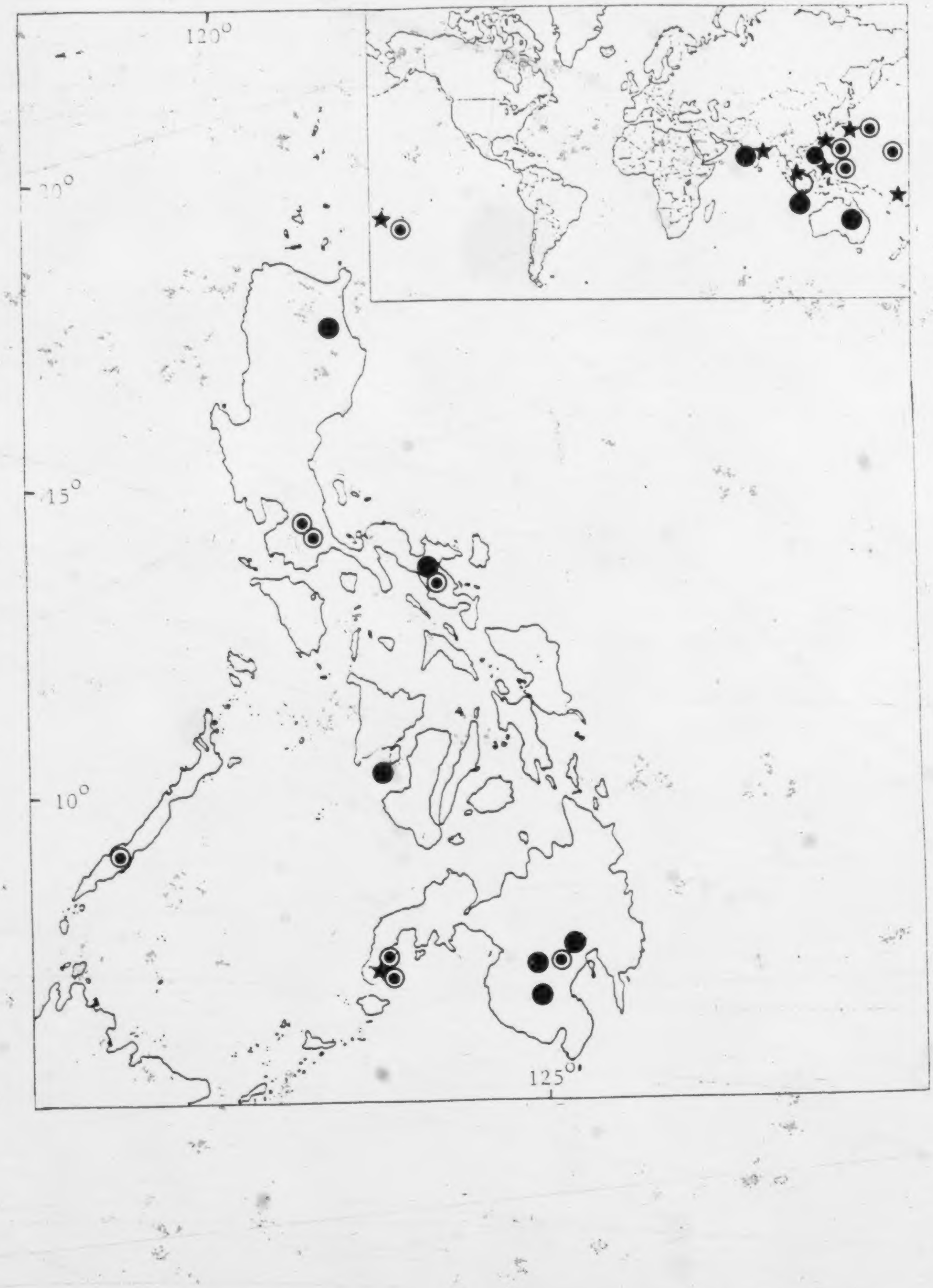
Distribution (Fig. 15). The known range of this species extends from Malaysia eastward in Taiwan to the other Pacific Islands. In the Philippine Archipelago, this species is known from the three principal zoogeographic regions, on the islands of Luzon, Palawan and Mindanao. PHILIPPINES: Luzon: San Pablo City; Laguna; Mudspring, Mt. Makiling, Laguna; Bicol, Expt. Sta., Pili, Camarines Sur; Palawan: BFD, Brooks Point; Mindanao: Anuling, Pamocotan, Zamboanga; FORI, Camp Susana, La Paz, Zamboanga, Agko, Mt.

Apo. SEYCHELLES IS. RODRIQUEZ IS. MALAYSIA: Selangor. TAIWAN. GUAM. JAPAN. MARIANNA IS. GILBERT IS. MARSHALL IS.

Hosts. *Bambusa* sp., *Canna speciosa*, leaves of *Musa sapientum*, *Ficus* sp., on leaves of vine with galls, leaves of *Ficus* sp., leaves of *Codiaeum variegatum*, *Portulaca pilosa*, Compositae, "million flower", *Morinda citrifolia*, *Cestrum pallidum*, *Ipomoea alba*, fallen leaves, leaves of *Morus* sp.

Fig. 15. Distribution of *Caliothrips striatopterus* (Kobus), *Copidothrips formosus* Hood and *Elixothrips brevisetis* Bagnall in the Philippines, and world.

● *Caliothrips striatopterus* (Kobus)
★ *Copidothrips formosus* Hood
◉ *Elixothrips brevisetis* Bagnall


120°
20°
15°
10°
125°

Genus *Helionothrips* Bagnall

Helionothrips Bagnall, 1932: 506.
Type species: *Helionothrips brunneipennis* (Bagnall) by original designation.

Diagnosis. Head about as long as wide, 2 times as long as wide in few taxa; occiput in form of wide, concave collar, with produced apodeme on anterior margin, parallel to posterior margin or arched anteriorly. Occipital collar completely reticulate; anterior reticules smooth, with internal vermiform wrinkles in few taxa; posterior reticules with dot-like thickenings. Ocelli large, placed on sides of raised ocellar hump. Eyes large, occupying over half the width of head, with two enlarged posteromarginal ommatidia in few taxa. Cheeks shorter than eye length. Antennae 8-segmented; segments III and IV vasiform, each with long, forked sense cone. Maxillary palpi 2-segmented. Mouthcone short and rounded.

Pronotum covered by hexagonal reticulations; foveae of rounded and apparently granulate reticules. Tarsi 1-segmented. Forewings with few setae on anterior vein, with 2 setae at apex; with small tuft of enlarged microtrichia at fork of veins in few taxa; anterior fringe cilia present; wing apex blunt. Meso and metanota with hexagonal reticulations. Mesoscutum entire, with median longitudinal pseudosplit in posterior third; postprocess of mesopraesternum long, with forked apex; metascutum with inverted, triangular sculpture medially. Metafurca enlarged, lyre-shaped as in *Caliothrips* spp.

Abdominal tergites with developed antecostal line, occasionally continued posteriorly in form of large, scallop-like areas. Tergite VIII with incomplete posteromarginal comb. Tergite X completely divided longitudinally. Sternites completely reticulate; sternites II to VIII with 3 pairs of long centrally located setae; sternite VIII with additional pair of setae posterior to and between inner 2 pairs of sternal setae, length and position variable within species. Tergite IX of male with thorn-like setae, caudad of a posterior pair of setae and on wart-like tubercles; sternites V1-VII each with circular glandular areas.

Adults of *Helionothrips* spp. are dark brown or black, with paler apical abdominal segments and infumate or banded wings in few taxa. They occur mainly in the old world tropics and 18 species are currently recognized (Mound and Houston, 1987). Two species *H. kodaliphilus* and *H. guttanicus*, n. sp. are known from the Philippines.

Key to Philippine species of *Helionothrips* Bagnall

1. Abdominal tergite VIII with comb of microtrichia complete; antennal segment IV with sense cone extended to base of segment VI (Fig. 16b)
.... *H. guttatus*, n. sp.

1' Abdominal tergite VIII with comb of microtrichia interrupted medially; antennal segment IV with sense cone not extended beyond apex of segment V
.... *H. kadaliphilus* (Ramakrishna and Margabandhu)

***Helionothrips guttatus*, n. sp.**
Holotype female, Philippines: Sagpangan, Agko, Mt. Apo (**UPLB**)
Figure 16a, b, c, d, e

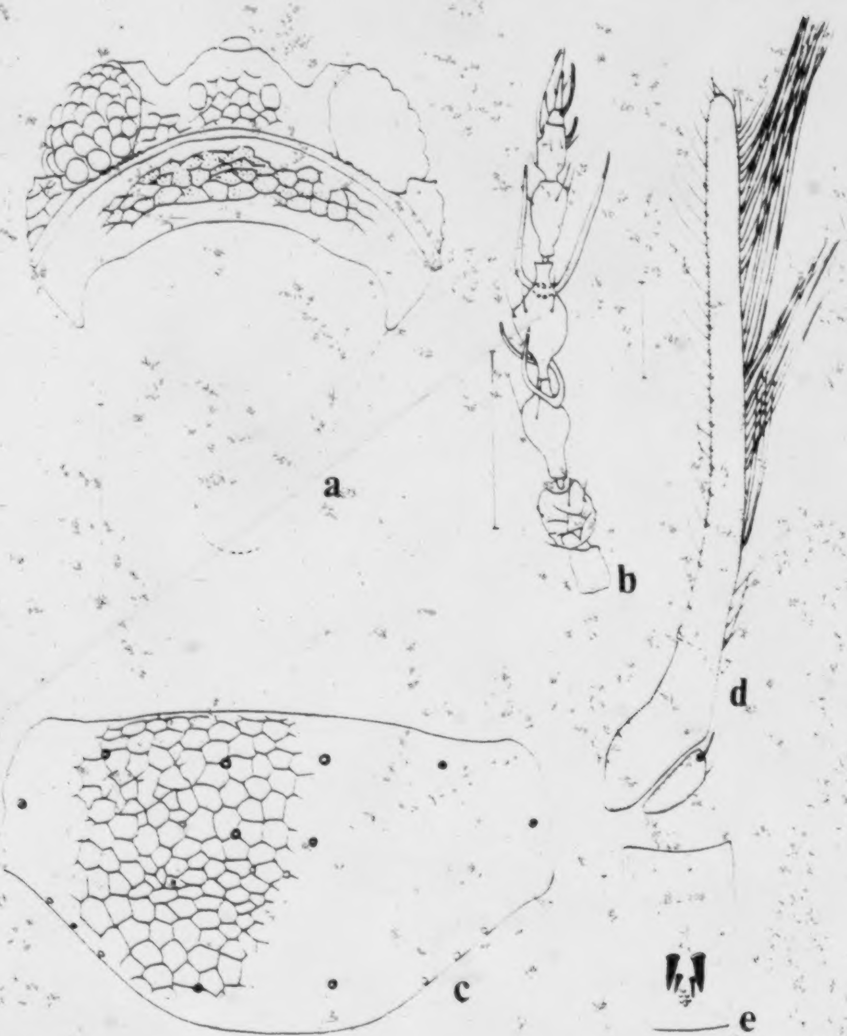
Diagnosis. Body dark brown. Head transverse, hexagonally reticulate. Occipital collar arched medially. Antennal segments III and IV pedicellate, vasiform and each with long, forked sense cone that of IV inserted ventrally and extended to base of segment VI. Pronotum hexagonally reticulate, rounded on posterior angles. Legs bicolored. Forewings brownish, with white subbasal patch; base dark brown; costal and vein setae minute. Antecostal line of abdominal tergites III to VIII in form of median, broad scallop with thickened anterior and lateral margins, open posteriorly. Posterior margin of tergite VIII with complete comb of microtrichia. Ovipositor longer than tergite X.

Adults of this species differ from those of *H. kodaliphilus* in having minute costal and vein setae on the forewings, abdominal tergite VIII with complete comb of microtrichia on posterior margin, and in having a transverse, elongate, glandular area on each of abdominal sternites III to VIII in males.

Female macroptera. Head wider than long, hexagonally reticulate (Fig. 16a). Ocellar hump prominent. Occipital collar arched medially, reticules without internal wrinkles. Eyes more than one-third as long as head and prolonged ventrally. Antennal segments I to V yellow; VI pale, brownish apically; VII to VIII greyish brown; segments III and IV pedicellate, vasiform, each with long, forked sense cone; sense cone of segment IV inserted ventrally and reaching base of segment VI (Fig. 16b). Mouthcone elongate, rounded (Fig. 16a).

Pronotum transverse, rounded on posterior angles; hexagonally reticulate; discal setae small (Fig. 16c). Forefemora and tibiae yellowish, with darker margins; mid and hindfemora brown, pale apically; mid and hindtibiae brown, with pale bases and apices; all tarsi yellow. Forewings brownish with subbasal white patch of moderate size; base dark brown; costal, anterior and posterior vein setae minute; posterior fringe cilia slightly wavy;

Fig. 16. *Helionothrips guttatus*, n. sp., female holotype. a. Head b. Right antenna c. Pronotum d. Forewing e. Male allotype, abdominal tergite IX


a
b
c
d
e

scale brown (Fig. 16d). Mesoscutal median sculpture divided posteriorly. Metascutal median sculpture in form of raised, inverted triangle.

Abdominal tergites each with median sculpture extended to posterior margin. Antecostal line of tergites III to VIII in form of median, broad scallop with thickened anterior and lateral margins and opening posteriorly. Posterior margin of tergite VIII with complete comb of microtrichia. B1 setae of tergite IX stout, each borne on tubercle, pointed apically. Tergite X completely divided longitudinally; median apical setae short, with blunt apices. Ovipositor longer than tergite X.

Dimensions (holotype female; um). Body length (extended) 1550.4. Head length 85, median width 200.6; dorsal eye length 47.6; antennal segments length: I 27.2; II 37.4; III 40.8; IV 59.5 V 35. 7; VI 32.3; VII 8.5; VIII 20.4. Pronotum length 160.5, median width 282.2.

Male macroptera. Similar to female in color and structure but smaller. Abdominal tergite IX with 2 pairs of thorn-like setae, posterior pair shorter and closer to each other than anterior pair; a cluster of 6 tubercles behind posterior pair (Fig. 16e). Sternites III to VIII each with a transverse, elongate glandular area.

Dimensions (allotype male; um). Body length (extended) 1346.4. Head length 78.2, median width 180.2; dorsal eye length 54.4; antennal segments length: I 20.4; II 40.8; III 51; IV 57.8; V 37.4; VI 30.6; VII 8.2; VIII 17. Pronotum length 160.5, median width 282.2.

Type data. **Holotype** female, PHILIPPINES: Mindanao, Sagpangan, Agko, Mt. Apo, on flower of everlasting, 5-V-1983, C. P. Reyes (**UPLB**). **Paratypes** (11 females, 9 males including allotype) same data as holotype (**UPLB**).

Material examined. Type series (**UPLB**); 8 females, Luzon: Bicol Experiment Station, Camarines Sur, on leaves of unknown tree, 5-VI-1987, C. P. Reyes; 2 females, Luzon: Bicol Experiment Station, Camarines Sur, on *Macaranga* sp. , 5-VI-1987, C. P. Reyes, 1 female, 1 male, same data, on leaves of *Ficus sp.*(**CPRC**).

Etymology. Guttatus is a Latin word meaning "spotted" in reference to the forewings of these thrips which have a subbasal white patch.

Distribution (Fig. 17). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: Bicol Experiment Station, Camarines Sur; Mindanao: Sagpangan, Agko, Mt. Apo.

Hosts. everlasting flower, leaves of unknown tree, leaves of *Macaranga* sp., *Ficus* sp.

Helionothrips kodaliphilus (Ramakrishna and Margabandhu)
Heliothrips kodaliphila Ramakrishna and Margabandhu,1931:1033-1034.
Lectotype female, India: Coimbatore, South India (**Madras**) [not examined]

Diagnosis. Body dark brown. Head reticulate, with slightly arched posterior collar. Antennal segments III and IV vasiform, each with forked sense cone; segment IV with sense cones reaching apex of segment V. Pronotum reticulate. Legs bicolored. Forewings brown with small white patch subbasally; base, middle and apex dark brown; vein setae dark. Mesoscutal sculpture notched posteriorly. Metascutal median sculpture in form of distinct triangle. Abdominal tergite I with antecostal line thickened, indented on lateral third. Posterior margin of tergite VIII with comb of microtrichia interrupted medially. Tergite IX and X with B1 setae pale each borne on small tubercle.

This is the first record of *H. kodaliphilus* in the Philippines.

Female macroptera. Head wider than long; hexagonally reticulate anterior to collar; reticules small; occipital collar slightly anteriorly arched medially; reticules of collar large. Ocellar hump small. Ocellar setae minute. Antennal segments I and II yellowish; III to V and base of VI yellow; apex of VI brown; VII and VIII greyish; segments III and IV vasiform, with forked sense cones; sense cone of IV long, nearly reaching apex of segment V. Mouthcone elongate, rounded.

Pronotum hexagonally reticulate; discal setae short. Forefemora light brown; foretibiae yellowish, with dark inner and outer margins; all tarsi yellow; mid and hindfemora dark brown with pale bases; mid and hindtibiae brown in basal two-thirds, pale in apical third. Forewings brownish with small white patch subbasally; base, middle and apex darker; vein setae dark. Mesoscutal sculpture shallowly notched posteriorly. Metascutal median sculpture in form of distinct triangle; hexagonally reticulate. Metascutellum reticulate.

Abdominal tergites with thickened antecostal line forming large median scallops. Antecostal line of tergite I thickened, indented on lateral third. Posterior margin of tergite

VIII with comb of microtrichia interrupted medially. Tergites IX and X with B1 setae pale, developed, with pointed apices, each borne on a small tubercle. Sternites reticulate.

Male macroptera. Similar to female in structure. Abdominal tergite IX with longitudinal row of 5 to 8 tubercles and with 2 pairs of stout, thorn-like setae; anterior pair stouter than posterior pair. Sternite VIII with small, circular, anteromarginal, glandular area.

Material examined. 1 female, Agko, Mt. Apo, on leaves of *Macaranga* sp., 5-V-1987, C. P. Reyes; 1 female, Agko, Mt. Apo, on leaves of unknown shrub, 4-V-1987, C. P. Reyes (CPRC).

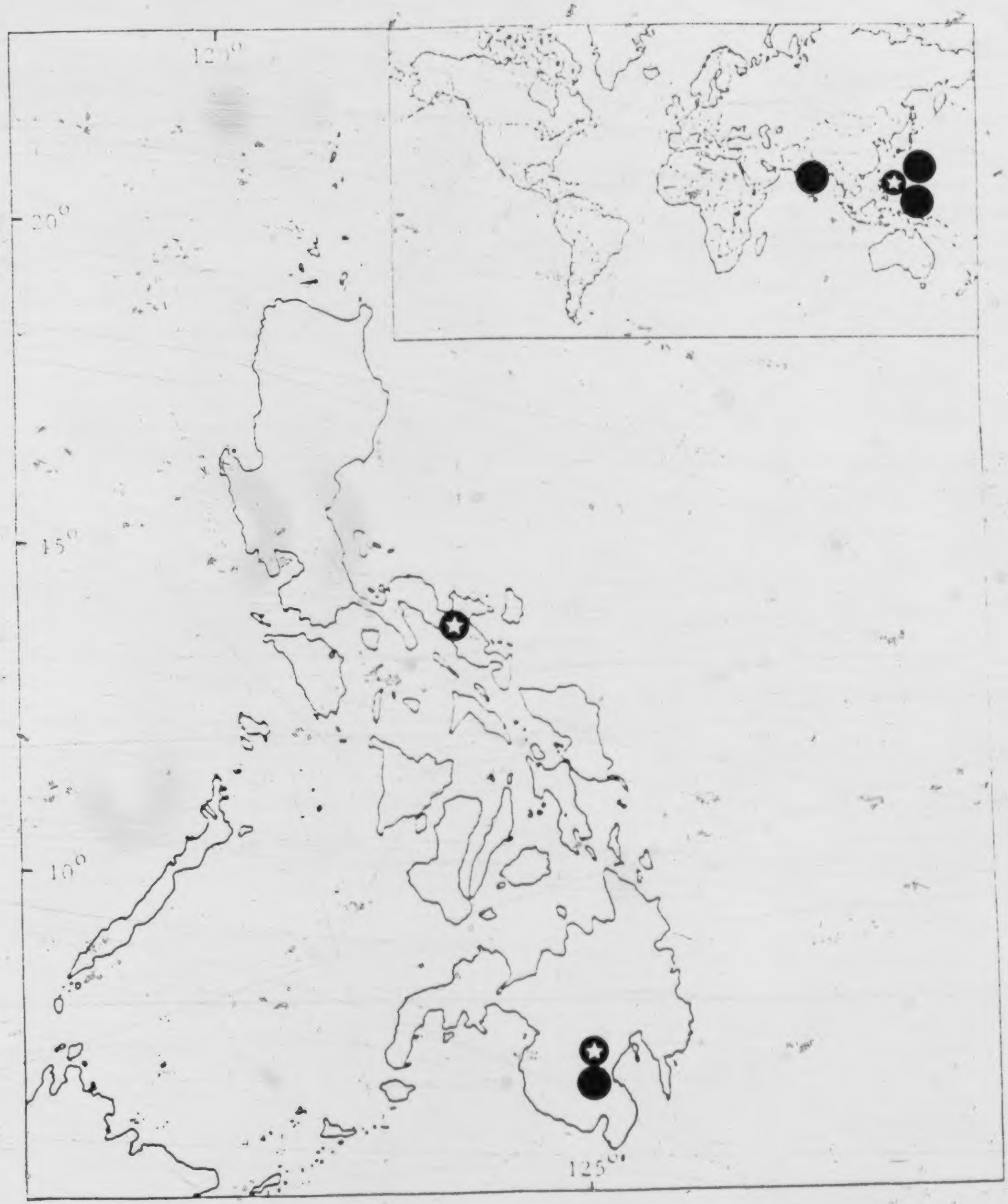
Distribution (Fig. 17). The known range of this species extends from India eastward in the Philippines to Papua New Guinea. In the Philippine Archipelago, this species is known from the island of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo. INDIA. PAPUA NEW GUINEA.

Hosts. This species is known as "banana leaf thrips" in India (Wilson, 1975). This species was also collected from the following: leaves of *Macaranga* and unknown shrub, *Anona squamosa*, *Calocasia* sp.

Fig. 17. Distribution of *Helionothrips* species in the Philippines, and world.

✪ *H. guttatus*, n. sp.

● *H. kodaliphilus* (Ramakrishna and Margabandhu)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Genus *Heliothrips* Haliday

Heliothrips Haliday, 1836: 443.
Type species: *Heliothrips adonidum* Haliday a synonym of *Thrips haemorrhoidalis* Bouche, by monotypy.

Diagnosis. Head reticulate, with neck-like constriction at base; setae minute. Ocellar area not elevated; foreocellus depressed into sculpture. Antennae 8-segmented; segments III and IV each with a simple sense cone, microtrichia absent. Maxillary palpi 2-segmented. Mouthcone broadly rounded.

Pronotum small, transverse, completely reticulate and with minute setae. Legs stout; tarsi 1-segmented. Forewings with minute setae, apex bluntly rounded; anterior fringe cilia present or absent; posterior fringe cilia straight; anterior vein fused to costal vein at fork of vein. Mesoscutum entire. Metascutum with distinct triangle of sculpture.

Abdominal tergites covered with reticulations except for pair of posterior, submedian, smooth areas,with transverse series of reticules anterior to antecostal line. Distance between tergal median setae various. Posterior margin of tergite VIII with complete comb of variously formed teeth. Tergite X completely divided longitudinally. Male with round, oblong or broadly transverse glandular areas on sternites III-VII. Tergite IX with 3 pairs of posteromedian, thorn-like setae.

Members of *Heliothrips* are common in the tropics and in greenhouses at higher latitudes. Females of the only 2 known species are difficult to distinguish.

***Heliothrips haemorrhoidalis* (Bouche)**
Thrips haemorrhoidalis Bouche, 1833: 42.
Holotype female, Germany: Berlin (**Lost**) [not examined]
Heliothrips haemorrhoidalis (Bouche); Kudo, 1980: 345-355.

Diagnosis. Body dark brown and covered with hexagonal reticulation except for median third of tergites. Ocellar area not produced. Antennal segment III pedicellate. Legs yellowish white. Forewings yellowish, broad basally; vein setae minute. Mesoscutal sculpture notched posteriorly. Metascutal median sculpture in form of broad triangle. Antecostal line of tergites thickened, anteriorly convex medially. B1 setae on tergites IX and X pale, stout, nearly pointed at apex.

Besides Bouche's original description there is no record of any examination of the type material of *haemorrhoidalis* and the species has since existed as a biological concept (Wilson, 1975).

Female macroptera. Head longer than wide, constricted towards base; hexagonally reticulate; reticules smaller anteriorly, reticules larger posteriorly; posterior collar absent. Ocellar area not produced. Ocellar setae minute. Antennal segments I and II brownish yellow; III to V yellow; VI brown on apical half; VII to VIII yellow; segment III pedicellate, III and IV each with simple sense cone. Mouthcone rounded.

Pronotum small, wider than long; lateral margins dark; hexagonally reticulate; median area with unraised sculpture; discal setae minute. Legs yellowish white. Forewings yellowish, wide at base; vein setae minute; anterior fringe cilia sparse; posterior fringe cilia wavy. Mesoscutal sculpture notched posteriorly. Metascutal median sculpture in form of broad triangle, uniformly reticulate. Metascutellum reticulate anteriorly, smooth posteriorly.

Abdominal tergites with large hexagonal reticulations laterally; median third smooth except for central, slightly depressed, reticulate area; depressed area with pair of median setae gradually lengthened on posterior tergites. Antecostal line of tergites thickened, anteriorly convex medially; reticules anterior margin to antecostal line not developed. Posterior margins of tergites VII to VIII with complete comb of developed teeth. B1 setae on tergites IX and X stout, pale, nearly pointed at apex.

Male macroptera. Similar to female in structure but smaller in size. Abdominal tergite IX with 3 pairs of stout, thorn-like setae posteromedially, anterior pair stouter than remainder. Abdominal sternites III to VII each with transverse, oblong glandular area. Structural variation in males of this species is of no taxonomic significance since *H. haemorrhoidalis* is thelytokous (Mound, 1976b).

Material examined. 5 females, Maddela, Quezon, on *Codiaeum variegatum*, 11-IX-1975, P. S. Raros; 9 females, VISCA, Baybay, Leyte, on leaves of "ceriales", 13-V-1987, C. P. Reyes; 2 females, on "almasiga" , on leaf of *Artrocarpus* sp., 13-V-1987, C. P. Reyes; 1 female, on flower of *Glericidia*, 12-V-1987, C. P .Reyes; 1 female, PNAC, Palawan, on leaf of *Sarcocephalus orientalis*, 27-V-1987, C.P.Reyes; 5 females, Agko, Mt. Apo, on leaves of unknown shrub, 4-V-1987, C. P. Reyes; 1 female, sweeping grass, 5-V-1987, C. P. Reyes; 4 females, Sagpangan, Agko, Mt. Apo, on leaves of unknown shrub, 5-V-1987, C. P. Reyes; 1 female, Mlang, North Cotabato, on leaves of Avocado plant, 16-V-1987, C. P .Reyes; 1 female, Malandag, Malungon, South Cotabato, on *Ipomoea batatas*, 25-II-1985, C. P. Reyes (**CPRC**).

Distribution. This species has a cosmopolitan distribution. In the Philippine Archipelago, this species is known from the four principal zoogeographic regions, on the islands of Palawan, Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: San Pablo City; Quezon; Maddela, Quezon; Visayas: VISCA, Baybay, Leyte; Palawan: PNAC, Aborlan; Mindanao: Agko, Mt. Apo; Sagpangan, Agko, Mt. Apo, Mlang, North Cotabato; Malandag, Malungon, South Cotabato.

Hosts. This species is also known as the "greenhouse thrips". Adults and larvae of *H. haemorrhoidalis* cause bleaching on leaves of several plants grown in glass houses and outdoors (Ananthakrishnan, 1973). This species is a pest on tea and of *Pinus* sp. in east

Africa and in coastal regions of eastern Australia (Pitkin and Mound, 1973), on *Cinchona* spp. in Madagascar, and a pest on tea in Kenya, Uganda and Tanzania (Jacot-Guillarmod, 1971). This species was also collected from the following: grass, dry plants, *Codiaeum variegatum*, leaves of "ceriales", "almasiga", leaf of *Artrocarpus*, flower of *Glericidia*, leaf of *Sarcocephalus orientalis*, leaves of unknown shrub, sweeping grass, leaves of Avocado plant, *Ipomoea batatas* , plants in virgin forest, leaves of mango, potted plants in greenhouse, *Eugenia* sp., *Citrus* sp., camphor, bamboo, leaves of croton, tea, dry vines, *Rhus verniciflua*, on numerous plants.

Genus *Hemingia* n. gen.

Type species: *Hemingia glandula* n. sp.

Diagnosis. Head wider than long, with hexagonal sculpture, raised sculpture in anterior part of head; ocellar hump small; cheeks deeply incut behind eyes. Eyes protruding. Antennae 8-segmented, segment III and IV vasiform, each with 1 simple sense cone. Mouthcone elongate, rounded.

Pronotum smaller than head with hexagonal reticulation and small setae. Tarsi 1-segmented. Forewings with bold veins, with 2 brown cross bands; costal, anterior and posterior vein setae pale, small or minute; anterior fringe cilia present; scale with well developed seta at apex. Mesoscutal sculpture completely divided. Metascutal median sculpture in form of distinct inverted triangle with ridges extended to posterior margin of metascutellum.

Abdomen narrowly attached to thorax. Abdominal tergite I smooth; tergite II with dense growth of trichoid processes on lateral thirds. Tergites III-VIII each with transverse striations on anterior half, with reticulations laterally. Tergite VIII without posterior comb of microtrichia. Tergite X asymmetrical, completely divided longitudinally ; apical setae expanded at apex. Male with pair of longitudinal, linear, ridge-like glandular areas on sternites VI-VIII; tergite IX with pair of spine-like setae.

Adults of *Hemingia* species are similar to those of *Elixothrips* and *Astrothrips* in having trichoid processes on abdominal tergite II. Members of the former differ from those of the other 2 genera in shape of antennal segments, in having minute anterior and posterior vein setae on the forewings, and by male possession of a pair of peculiar, longitudinal, linear, ridge-like glandular areas in sternites VI-VIII. Females of *Hemingia* have an asymmetric tergite X with expanded apical setae; a divided mesoscutum; metascutal sculpture extending posteriorly over metascutellum as do those of *Elixothrips*.

Etymology. It is my pleasure to name this genus after Dr. Bruce S. Heming, my Ph. D. supervisor and student of thysanopteran structure, function and development.

Hemingia glandula, n. sp.

Holotype female, Philippines: Mindanao: Sagpangan, Agko, Mt. Apo (**UPLB**)
Figure 18a, b, c, d, e, f, g

Diagnosis. Body yellowish brown. Head with raised hexagonal reticulation on posterior two-thirds. Eyes protruding. Cheeks deeply incut behind eyes and at base. Antennal segments III and IV vasiform, subequal in length, each with long, simple sense cone. Pronotum hexagonally reticulate. Legs slender; bicolored yellow and brown. Forewings with 2 brown, cross bands; base brown, apex pale; veinal setae small to minute. Abdominal tergite II with trichoid processes on lateral half. Tergite X asymmetric; median apical setae with expanded apices.

In addition to the generic characters cited above, members of this species are distinct in having cheeks deeply incut behind the eyes and base of forewings with 2 brown, cross bands. This species is unique in having a pair of ridge-like glandular areas on abdominal sternites VI-VIII in males.

Female macroptera. Head yellowish brown, wider than long, with raised hexagonal reticulation on posterior two-thirds (Fig. 18a). Ocellar hump small. Eyes protruded. Cheeks deeply incut behind eyes and at base. Antennal segments I and II brownish; III to V yellow, with darker margins; VI to VIII greyish brown; segments III and IV elongate, vasiform, subequal in length, each with simple sense cone (Fig. 18b). Mouthcone elongate, rounded (Fig. 18a).

Pronotum brown, with dark lateral margins, smaller than head; hexagonally reticulate; discal setae small (Fig. 18c). Legs slender, reticulate; forelegs yellowish, with darker margins; mid and hindfemora brown, with yellow bases; midtibiae brown, pale apically; hindtibiae yellow, with darker lateral margins; all tarsi yellow. Forewing with 2 dark, cross bands; base brown, apex pale; microtrichia developed; anterior and posterior vein setae small; anterior fringe cilia longer than costal setae; posterior fringe cilia slightly wavy; scale brown with developed seta at apex (Fig. 18e). Mesoscutal

Fig. 18. *Hemingia glandula*, n. sp., female holotype. a. Head b. Right antenna c. Pronotum d. Meso and metanotal sculpture

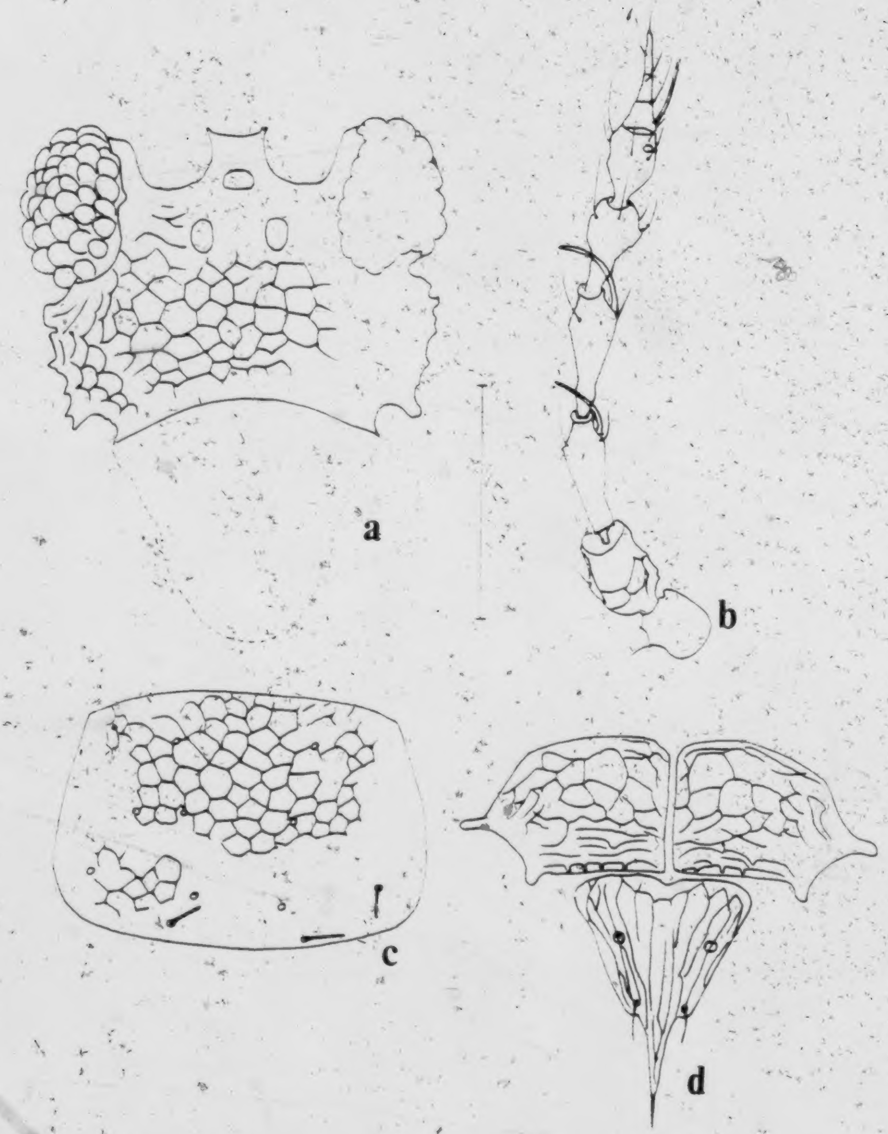
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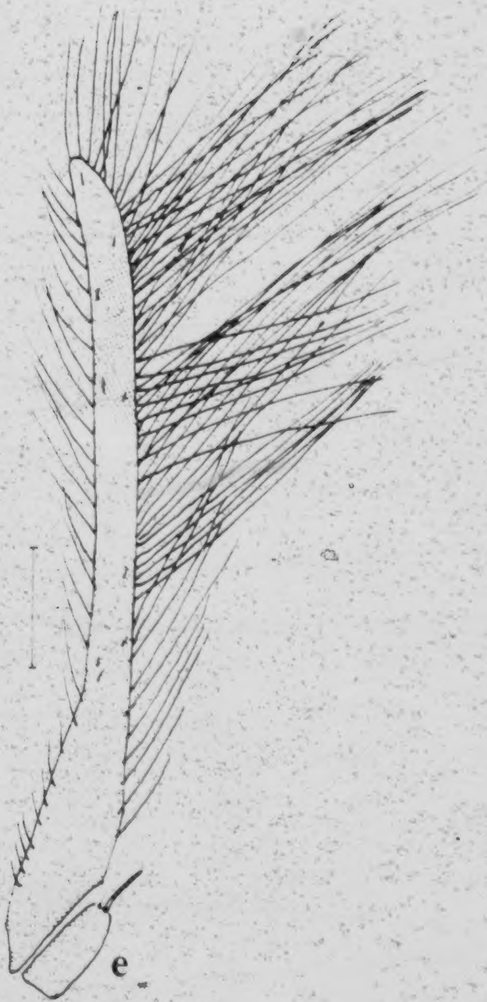
Fig. 18. *Hemingia glandula*, n. sp., female paratype. e. Forewing. f. Male allotype, abdominal tergite IX. g. Male allotype, abdominal sternites VI to VIII



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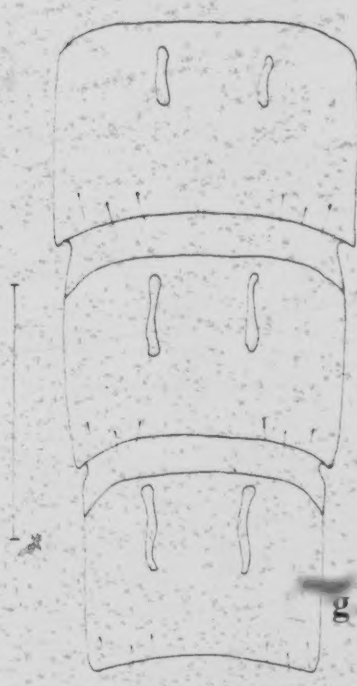

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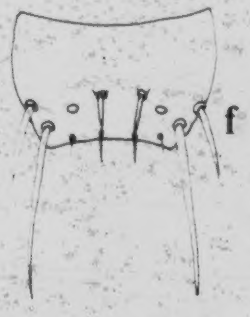


f

median sculpture completely divided along longitudinal midline. Metascutal median sculpture in form of distinct inverted triangle, with ridges extended to metascutellum (Fig. 18d). Metascutellum smooth.

Abdomen dark brown, narrowly attached to thorax. Abdominal tergite I indented laterally on each side. Tergite II with trichoid processes on lateral half. Tergites III to VIII reticulate laterally, with transverse striations on anterior third. Tergite X reticulate, asymmetric, completely divided longitudinally; median apical setae short, with expanded apices.

Dimensions (holotype female; um): Body length (extended) 1475.6. Head length 112.2, median width 173.4; dorsal eye length 68; antennal segments length: I 27.2; II 39.1; III 59.5; IV 54.4; V 40.8; VI 34; VII 20.4; VIII 28.9. Pronotum length 119, median width 204.

Male macroptera. Similar to female in structure but smaller. Abdominal tergite IX with a pair of median, thorn-like setae, each borne on a tubercle (Fig. 18f). Abdominal sternites VI to VIII each with a pair of longitudinal, linear, ridge-like glandular areas (Fig. 18g).

Dimensions (allotype male; um). Body length (extended) 1176.4. Head length 102, median width 146.2; dorsal eye length 57.8; antennal segments length: I 20.4; II 34; III 64.6; IV 51; V 40.8; VI 30.6; VII 13.6; VIII 25.5. Pronotum length 96.9, median width 149.6.

Type data. **Holotype** female, PHILIPPINES: Mindanao: Agko, Mt. Apo, on leaves of *Sarcocephalus orientalis*, 5-V-1987, C. P. Reyes (**UPLB**). **Paratypes** (2 females, 1 male) same data as holotype (**UPLB**)

Material examined. Type series only (**UPLB**).

Etymology. Glandula is a Latin word meaning "gland" in reference to the ridge-like glandular areas on abdominal sternites in males of these thrips.

Distribution (Fig. 20). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo.

Host. leaves of *Sarcocephalus orientalis*

Genus *Panchaetothrips* Bagnall

Panchaetothrips Bagnall,1912a: 257-258.
Type species: *Panchaetothrips indicus* Bagnall, by original designation

Diagnosis. Head wider than long, reticulate; occipital apodeme ridge-like, protruded laterally and in form of wide parallel collar; ocellar area slightly swollen. Eyes protruded, pilose. Cheeks slightly bulged and constricted toward base. Antennae elongate, 8 -segmented; segments III and IV each with a simple or forked sense cone; microtrichia absent. Maxillary and labial palpi 2- segmented. Mouthcone short and broad.

Pronotum transverse, anterior third wider than posterior two thirds, covered by transverse reticules; setae small. Legs long; tarsi 2 -segmented. Forewings brown except for small, wedge-like white patch at fork of vein, apex pointed; surface covered with long fine microtrichia; anterior vein fused to costa and with long, strong setae; posterior vein located in upper part of wing. Mesoscutum entire, reticulate; post process of mesopraesternum well developed. Metascutellum smooth or faintly sculptured.

Abdomen broad. Tergite I smooth with median pair of closely set, minute setae. Tergite II with lateral sculpture extended to submedian pores; median half smooth. Tergites II-VIII each with 3 pairs of lateral setae and campaniform sensillum between inner and middle pair. Pleurites VII-IX and apex of tergite X with long, stout setae. Tergite X tubiform, completely divided longitudinally and with long, stout setae. Sternites each with 3 pairs of slender setae. Males with abdominal segment VIII elongate, constricted in middle. Tergites VIII-IX with long stout pleural setae, IX with smaller, median pair of setae. Sternites III-VII each with transverse, linear, ridge-like glandular area.

Panchaetothrips species are mainly confined to the old world tropics and are distinctive in their females having a tubiform abdominal tergite X. The anterior vein of the forewings is fused to the costa, and a simple or forked sense cones or both are present on antennal segments III and IV. There are 4 species known in this genus including, *P. stepheni* n. sp., described below from the Philippines (Wilson, 1975).

***Panchaetothrips stepheni*, n. sp.**
Holotype female, Philippines: Luzon: Mudspring, Mt. Makiling (UPLB)
Figure 19 a, b, c, d, e

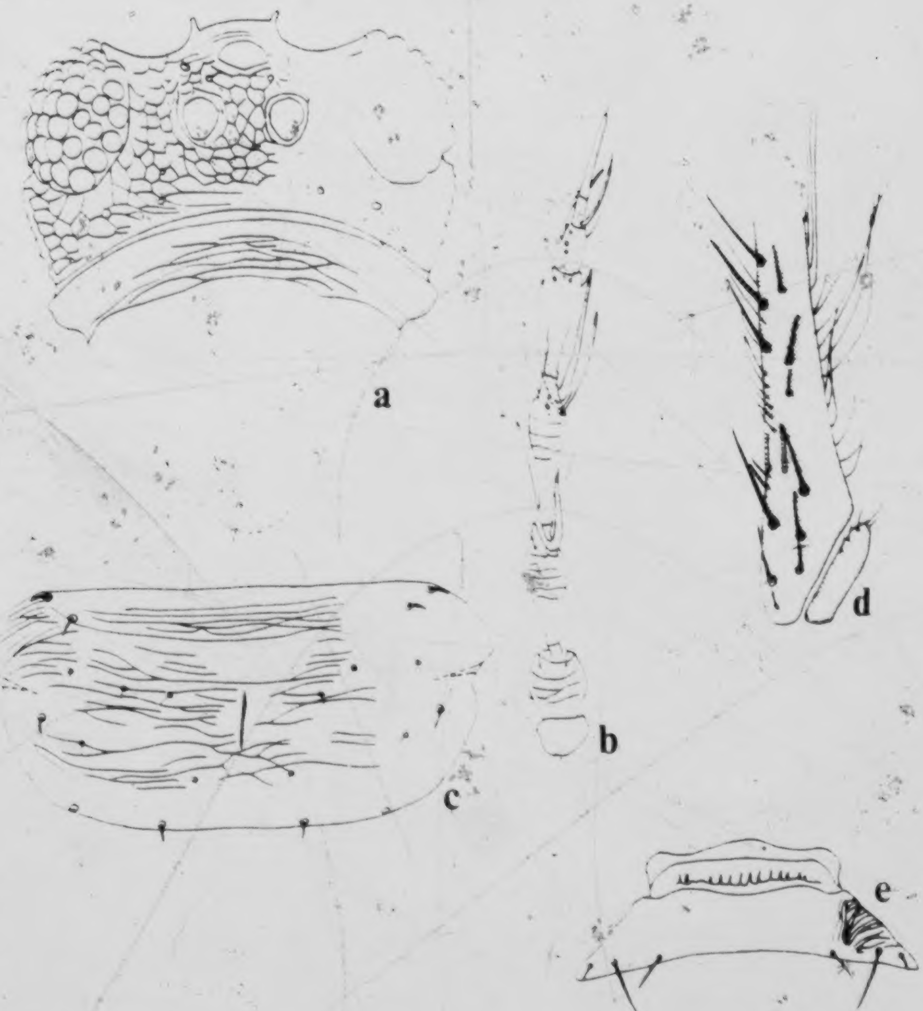
Diagnosis. Body dark brown. Head with posterior collar; reticulate; reticules with internal dot-like thickenings. Cheeks incut behind eyes. Antennal segments III and IV vasiform, about of equal length; segment IV with ventral, forked and dorsal, simple sense cones. Pronotum transversely striate. Legs bicolored yellow and brown. Forewings brown, with small, white wedge-like patch at fork of veins; anterior vein totally fused with costa; veinal setae strong and dark. Abdominal tergite X tube-like, completely divided longitudinally.

This species can be easily distinguished from other known species of *Panchaetothrips* in many respects but principally in having both forked and simple sense cones on antennal segment IV, and in the shape of the white, wedge-like patch at the fork of the veins on the forewings.

Female macroptera. Head wider than long; reticulate; reticules with internal dot-like thickenings; posterior collar with transverse striae medially (Fig. 19a). Ocellar hump small. Interocellar and postocular setae small. Eyes more than one-third as long as head length. Cheeks incut behind eyes. Antennae more than 2 times as long as head; segment I yellowish brown; II brown; III yellow; segment IV to V yellow basally, shaded with brown apically; VI to VIII greyish brown; segment III and IV vasiform, subequal in length; segment III with a forked sense cone; segment IV with a ventral, forked and a dorsal, simple sense cones (Fig. 19b). Mouthcone elongate, rounded (Fig. 19a).

Pronotum transverse, with transverse, anastomosed striae; discal setae small (Fig. 19c). Femora slightly enlarged, brown medially, yellow basally and apically; tibiae yellowish brown, with dark lateral margins and paler apices; tarsi yellow. Forewings brown, with small, white, wedge-like patch at fork of veins; anterior vein totally fused with costa; setae strong, dark; posterior vein setae shorter than those on anterior vein (Fig. 19d).

Fig. 19. *Panchaetothrips stepheni*, n. sp., female holotype. a. Head b. Right antenna c. Pronotum d. Basal half of right forewing e. Abdominal tergites I and II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Mesonotum transversely reticulate. Metascutal median sculpture forming broad, unraised, inverted triangle.

Abdomen narrowly attached to thorax. Tergite I narrow, with indented lateral margins (Fig. 19e). Tergite II with lateral sculpture convergent to submedian pores. Tergites III to VIII weakly reticulate laterally. B setae on tergite IX stout, with pointed apices. Tergite X tube-like, completely divided longitudinally; median apical setae shorter than B setae on IX.

Dimensions (holotype female; um). Body length (extended) 1598. Head length 122. 4, median width 210.8; dorsal eye length 71.4; antennal segments length: I 23.8; II 37.4; III 81.6; IV 91.8; V 68; VI 30.6; VII 17; VIII 54.4. Pronotum length 115.6, median width 248.2.

Male. Unknown.

Type data. **Holotype** female, PHILIPPINES: Luzon: Mudspring, Mt. Makiling, on Rubiaceae, 27-VI-1987, C. P. Reyes (**UPLB**). **Paratypes** (6 females) same data as holotype (**UPLB**).

Material examined. Type series (**UPLB**); 1 female, Luzon: Makiling rainforest, Mt. Makiling, on flower of unknown shrub, 27-VI-1987, C. P. Reyes; 1 female, Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro, on wild *Mussaenda*, 19-VI-1987, C. P. Reyes; 1 female, Mindanao: Mlang, North Cotabato, on *Plumiera acutifolia*, II-V-1987, C. P. Reyes(**CPRC**).

Etymology. This species is named after my husband, Stephen G. Reyes, for providing several thrips specimens and for his considerable assistance during the preparation of this paper.

Distribution (Fig. 20). The known range of this species is confined to the Philippine Archipelago, where it is known from the three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: Mudspring, Mt.

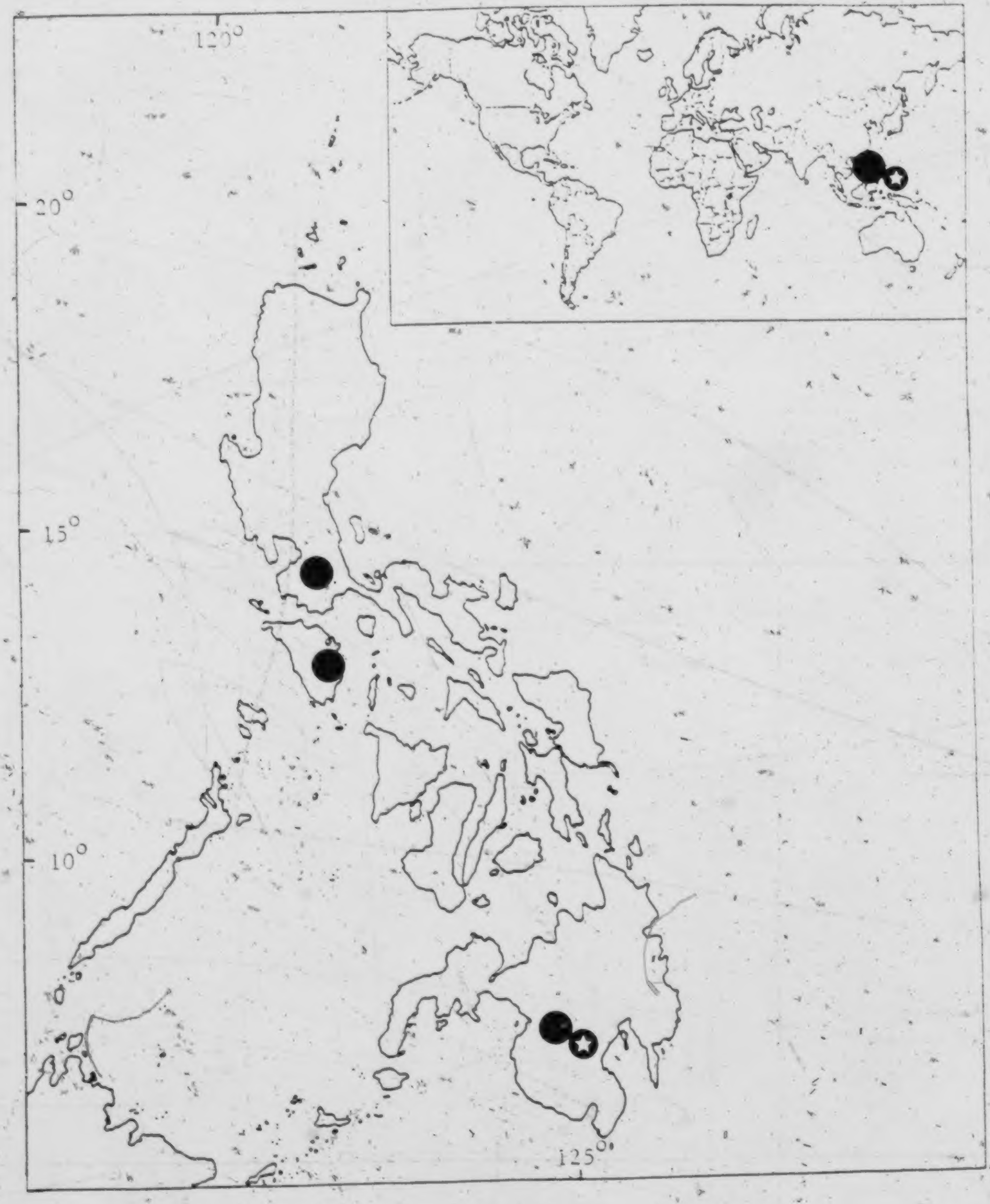
Makiling; Makiling Rainforest, Mt. Makiling; Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro; Mindanao: Mlang, North Cotabato.

Hosts. Rubiaceae, on flower of unknown shrub, wild *Mussaenda*, *Plumiera acutifolia*

Fig. 20. Distribution of *Hemingia glandula*, n. sp. and *Panchaetothrips stepheni*, n. sp.

✪ *Hemingia glandula*, n. sp.

● *Panchaetothrips stepheni*, n. sp.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Genus *Phibalothrips* Hood

Phibalothrips Hood,1918:125.

Type species: *Phibalothrips exilis* Hood, a synonym of *Heliothrips longiceps* Karny, by original designation and monotypy.

Diagnosis. Head as long as wide or longer, with developed, thick-walled reticules and neck-like constriction toward base; setae minute. Ocelli raised on small, anterior hump. Cheeks longer than lateral portion of eyes. Maxillary palpi 2- segmented. Antennae 7-segmented; segments III and IV slender and elongate, each with simple sense cone. Mouthcone rounded.

Pronotum transverse, lateral margins expanded, reticules weaker than on head; setae minute. Tarsi 1- segmented. Forewings long, slender, parallel-sided; anterior fringe cilia absent; anterior vein fused to costal vein; venal setae minute; posterior fringe cilia straight. Mesoscutum entire; metascutal median sculpture in formed of raised triangle.

Abdomen with polygonal reticules on lateral thirds; reticules with internal, longitudinal wrinkles. Tergites smooth medially with broad, median longitudinal ridge. Tergite IX with long apical setae . Tergite X completely divided longitudinally. Sternite II hexagonally reticulate on anterior half. Males similar to females; tergite IX smooth medially, with 2 pairs of widely spaced, long, median setae. Sternites III-VII each with a round to oval anteromedian glandular area.

Adults of *Phibalothrips* are small, slender, bicolorous thrips inhabiting grasses in the old world tropics. There are 5 known species (Wilson, 1975), one of which, *P. peringueyi*, is known from the Philippines.

Phibalothrips peringueyi **(Faure)**
Reticulothrips peringueyi Faure, 1925: 145.
Holotype female, South Africa: Arcadia, Pretoria, Transvaal (**Transvaal**) [not examined]
Phibalothrips peringueyi (Faure); Kudo, 1980: 350.

Diagnosis. Body small, slender, bicolored. Head and thorax dark brown; abdomen yellow. Head quadrate, constricted towards base; reticulate. Ocellar hump small. Antennal segments III and IV elongate, vasiform. Legs predominantly yellow. Forewings slender, yellow with dark base. Mesoscutal sculpture notched posteriorly. Metascutal median sculpture forming raised triangle. Abdominal tergites each with longitudinally raised area medially; lateral third of tergites covered with hexagonal reticules. B1 setae on tergite IX longer than B1, pointed at apex.

My interpretation of this species is based mainly on that of Wilson (1975). Kudo (1980) reported 3 females of *P. peringueyi* from Manila and San Pablo City areas.

Female macroptera. Head quadrate; constricted towards base; reticulate; discal setae minute. Ocellar hump small. Antennal segments I to IV, basal three quarters of V light yellow; apical quarter of V brown; segments VI to VII entirely brown; segment II barrel-shaped; segments III and IV long, slender and vasiform, each with simple sense cone; segments IV to VII in form of unit, each with distinct sutures. Mouthcone elongate, rounded.

Pronotum wider than long; slightly reticulate; lateral margins expanded along entire length; discal setae minute. Hindcoxae close to each other; forelegs brownish yellow; mid and hindlegs yellow. Forewings yellow with dark brown base, slender; vein setae minute. Mesoscutal sculpture shallowly notched posteriorly or entire. Metascutal median sculpture formed as raised triangle, uniformly reticulate. Metascutellum rectangular, slightly reticulate.

Abdominal tergites yellow, smooth, each with longitudinally raised area medially; lateral third covered with hexagonal reticules with internal, longitudinal wrinkles. Posterior margin of tergites with tooth-like comb of microtrichia laterally. B2 setae on tergite IX longer than B1 setae and pointed at apex. Tergite X with B1 setae short, pointed at apex. Sternite II hexagonally reticulate on anterior half, smooth on posterior half.

Male macroptera. Similar to female in color and structure. Abdominal tergite IX with small, widely spaced pair of median setae, followed by developed, more lateral pair setae. Sternites III to VIII each with small, broadly oval, anteromedian glandular area.

Material examined. Although I was not able to examine Kudo's collection from the Philippines, I did examine a female from Kaira, India which T. N. Ananthakrishnan kindly gave me for my reference collection.

Distribution (Fig. 21). The known range of this species extends from Southern Rhodesia eastward in India, to Southeast Asia. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: Manila, San Pablo City. CHINA. MALAYSIA. INDONESIA: Java. THAILAND. SRI LANKA. PAKISTAN. SOUTHERN RHODESIA. TRANSVAAL. INDIA. TAIWAN. JAPAN. HONGKONG.

Hosts. grass, bamboo, basal dry grass tufts, Berlese sample of *Bathricola intermedis*, leaflets of soybean, maize, *Panicum*, *Hyparrhenia hirta*, *Popowia obovata*, *Anona sp*., *Bachystegia filiformis*, *Andropogon pertusus*, *Chloris barbata*, sweeping grass, on Graminae

Genus *Retithrips* Marchal

Retithrips Marchal 1910: 17

Type species: *Retithrips aegypticus* Marchal a synonym of *Retithrips syriacus* Mayet, by
monotypy.

Diagnosis. Head small, transverse, reticulate with small setae; fore ocellus on anterior hump. Eyes large, longer than head. Antennae stout, 8- segmented, with suture between segments VII and VIII indistinct in few taxa; segments III and IV each with 2, long, simple sense cones borne on a single base. Maxillary palpi 2 -segmented. Mouthcone broadly rounded.

Pronotum transverse, with small setae. Legs stout, tarsi 1-segmented. Forewings large, shaded, surface leathery, with calluses between costa and anterior vein; anterior fringe cilia absent; posterior fringe cilia straight. Meso and metanota unusually wide. Mesoscutum entire or not completely divided. Metascutum with hexagonal sculpture; metafurca large.

Abdomen broad with median depression on tergites III-X; median setae long. Posterior margin of tergite VIII with complete comb of long microtrichia. Tergites with transverse, scallop-like, line anteriorly.

Retithrips species are easily recognized by their forewings which have leathery surfaces and anteromarginal callosities, by the broad pterothorax and abdomen, and by the presence of 2 simple sense cones sharing a common base on each of antennal segments III and IV. Only 2 species are included in this genus (Wilson, 1975).

Retithrips javanicus Karny

Retithrips javanicus Karny, 1923: 364.
Lectotype female, Indonesia: Buitenzorg Garden, Java (SMFG) [examined]

Diagnosis. Body blackish brown and covered with hexagonal reticulations. Head and prothorax small, wider than long; pterothorax and abdomen broad. Ocellar hump enlarged. Antennal segments VII and VIII elongate, slender. Legs bicolored. Forewings broad with 2 calluses between costal and anterior veins; apex narrow, nearly rounded. Mesoscutal sculpture notched posteriorly. Metascutal median sculpture formed as broad triangle. Abdominal tergites hexagonally reticulate. Tergite I slightly constricted laterally. B1 setae on tergite IX stout each borne on tubercle.

This is the first record of *R. javanicus* in the Philippines. The forelegs of females are yellowish whereas the forelegs of those from Java are brown.

Female macroptera. Head small, wider than long; hexagonally reticulate ; reticules smaller anteriorly, larger posteriorly. Ocellar hump enlarged. Ocellar setae minute. Antennae light brownish yellow; segment II darker; VI to VIII elongate, slender. Mouthcone rounded.

Pronotum small, rectangular; hexagonally reticulate; discal setae small. Legs rather stout; forelegs brown or yellowish; mid and hind femora dark brown; midtibiae, basal 3 quarters of hindtibiae brown; apical quarter of hindtibiae and all tarsi yellow. Forewings brown, broad, with 2 calluses between costal and anterior veins; apex narrow, nearly rounded; anterior fringe cilia absent; posterior fringe cilia straight. Meso and metanota broad, darkened on lateral margins. Mesoscutal sculpture notched posteriorly. Metascutal median sculpture in form of broad triangle, uniformly reticulate; reticules with internal, dot-like thickenings. Metascutellum with large, hexagonal reticulation medially, reticules smooth.

Abdomen broad. Tergites hexagonally reticulate; lateral reticules with internal, dot-like thickenings; median reticules smooth; median setae gradually getting longer on posterior tergites. Tergite 1 slightly constricted laterally. Tergite VIII with comb of microtrichia on posterior margin. Tergite IX with B1 and B2 setae pale, stout, pointed at apex and each borne on a tubercle; B1 setae longer than B2.

Male macroptera. Similar to female in structure. Color of legs lighter. Abdominal sternites III to VII each with small oblong glandular area.

Material examined. 14 females, 1 male, UPLB, Los Banos, Laguna, on *Hyptis brevipes*, 20-X-1982, C. P. Reyes; 2 females, UPLB, Los Banos, Laguna, on leaves of unknown plant, 2-II-1985, M. Navasero; 11 females, Bicutan, Taguig, Rizal, on leaves of *Quisqualis indica*, 20-X-1982, C. P. Reyes; 11 males, Bicutan, Taguig, Rizal, on *Hyptis brevipes*, 21-X-1981, J. Balatibat (**CPRC**).

Distribution (Fig. 21). The known range of this species extends from Burma eastward in the Indonesia Archipelago to Australia. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: UPLB, Los Banos, Laguna; Bicutan, Taguig, Rizal. SINGAPORE. INDONESIA: Java. BURMA. AUSTRALIA.

Hosts. The primary host plant of this species seems to be *Quisqualis indica* for specimens from Indonesia (Karny, 1923) were also collected from the same plant. This species was also collected from leaves of *Hyptis brevipes* and of an unknown plant.

Genus *Rhipiphorothrips* Morgan
Rhipiphorothrips pulchellus Morgan,1913:17.
Type species: *Rhipiphorothrips pulchellus* Morgan by original designation.

Diagnosis. Head rugose, with slightly depressed collar across posterior third of dorsum and with 3 or 4 crescentic rows of irregular reticules. Cheeks long, slightly depressed in middle. Ocelli widely separated, not raised in hump. Antennae 8-segmented; segments III and IV each with simple or forked sense cone; microtrichia absent. Maxillary palpi 2-segmented. Mouthcone short and rounded.

Pronotum rugose and rounded; setae small. Legs stout, reticulate; femora swollen; tarsi 1- segmented. Forewings without anterior fringe cilia; posterior fringe cilia in apical two thirds of wing straight; venal setae minute; surface of wing with scattered, minute, microtrichia, bases thickened. Mesonotum wide, swollen on anterolateral margin, with enlarged spiracles. Mesoscutum completely divided. Metascutum with sculpture in form of inverted triangle; metanotum sculptured laterally.

Abdominal tergites I-IX increasingly rugose toward posterolateral margins, each with median longitudinal depression, defined polygonal reticules and a pair of median, bristle-like, setae borne on tubercles. Antecostal line within median depression of tergites III-IX with row of microtrichia. Median posterior third of tergites III-VIII each with scattered microtrichia. Posterior margin of tergites VII and VIII each with pair of combs of about 5 teeth each. Apical setae on tergites IX and X stout, with fan-shaped apices. Tergite X cone-shaped, divided longitudinally. Male with median, circular, glandular area on antecostal line of each of sternites III-VII.

Rhipiphorothrips is a paleotropical genus with *P. pulchellus* known from the Philippines. They are easily distinguished by their rugose sculpture on the head and body and by the longitudinal depression of the abdominal tergites as in *Retithrips* Marchal. There are 4 species included in this genus (Wilson, 1975).

Rhipiphorothrips pulchellus Morgan
Rhipiphorothrips pulchellus Morgan, 1913:17.
Holotype male, Philippines: Manila (**USNM**) [examined]

Diagnosis. Body bicolored. Head, lateral margins of pterothorax, meso and metascutum blackish brown; prothorax, median portion of pterothorax, abdomen and legs yellow. Body covered with rugose sculpture. Ocellar hump small. Antennal segments III and IV vasiform. Forewings yellowish; base brown; anterior fringe cilia absent; vein setae minute. Mesoscutal sculpture completely divided longitudinally along midline. Metascutal median sculpture in form of distinct triangle extended posteriorly to metascutellum. Abdominal tergites with median comb of microtrichia on posterior margins. Tergite IX with lateral setae large; apices greatly expanded. *R. pulchellus* is the earliest recorded terebrantian from the Philippines.

Male macroptera. Head slightly longer than wide; sculpture rugose; moderately rugose anterior of collar. Ocellar hump small. Antennal segments I to V and basal half of VI pale yellow; apical half of VI and VII to VIII brown; segments III and IV vasiform, each with a simple sense cone. Mouthcone elongate, rounded.

Pronotum yellowish brown, lateral margins darker, with rugose sculpture; lateral margins expanded along entire length; discal setae minute. Legs yellow, stout. Forewings yellowish white, brown basally; anterior fringe cilia absent; anterior and posterior vein setae minute; posterior fringe cilia straight; scale brown. Meso and metanota yellow medially, dark brown laterally. Mesoscutal sculpture completely divided longitudinally along midline. Metascutal median sculpture forming distinct triangle extending posteriorly to metascutellum. Metascutellum reticulate medially.

Abdominal tergites with bold wrinkles except median, depressed area, the latter with developed median setae and reticulate. Posterior margins of tergites with long comb of microtrichia medially. Tergite IX with small, posteromedian setae, with expanded apices; lateral setae large, with expanded apices. Tergite X with B1 setae small, with expanded apices. Sternites III to VII each with large, median circular glandular area placed anterior to antecostal line.

Female macroptera. Similar to male in structure and color.

Material examined. 2 females, 1 male, UPLB, Los Banos, Laguna, on *Sarcocephalus orientalis*, 30-X-1982, C. P. Reyes; 1 female, UPLB, Los Banos, Laguna, on *Boobenia* sp., 30-X-1982, C. P. Reyes; 2 females, UPLB, Los Banos, Laguna, on *Terminalia catappa*, 30-X-1982, C. P. Reyes; 2 females, Los Banos, Laguna, on *Eugenia jambolana*, 30-X-1982, C. P. Reyes; 5 females, 2 males, UPLB, Laguna, on leaves of *Eugenia jambolana*, 30-X-1982, C. P. Reyes; 1 female, male, Wright Park, Baguio City, on *Rosa* sp., 8-XII-1984, C. P. Reyes; 1 male, Almazar, Alabang, on *Suzygium cuminii*, 2-II-1985, M. Alba; 1 female, 1 male, La Granja, La Carlota, on leaves of *Ricinus communis*, 26-V-1987, C. P. Reyes; 6 females, 1 male, Pasonanca Park, Zamboanga City, on leaves of *Lagerstonia* sp., 13-VII-1983, C. P. Reyes; 5 females, 3 males, Mlang, North Cotabato, on *Bixa orellana*, II-V-1987, C. P. Reyes; 1 female, Mlang, North Cotabato, on *Sandoricum koetjape*, 17-II-1985, C. P. Reyes; 8 females, 3 males, Bagontapay, Mlang, on leaves of *Ricinus communis*, 10-V-1987, C. P. Reyes; 5 females, 4 males, Agko, Mt. Apo, on flower of "aguingay', 4-V-1987, C. P. Reyes (**CPRC**); **Holotype** male, PHILIPPINES: Manila, on banyan tree, 1910, George Compere; **Paratypes** (1 male, 3 females), same data as holotype (**USNM**).

Distribution (Fig. 21). The known range of this species extends from India eastward in Taiwan, to the Indonesia Archipelago. In the Philippine Archipelago, this species is known from the three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: Manila; UPLB, Los Banos, Laguna; Wright Park, Baguio City; Almazar, Alabang, Rizal; Visayas: La Granja, La Carlota; Mindanao: Mlang, North Cotabato; Bagontapay, Mlang, North Cotabato; Agko, Mt. Apo. SRI LANKA. INDONESIA: Java. TAIWAN. BURMA. THAILAND. INDIA.

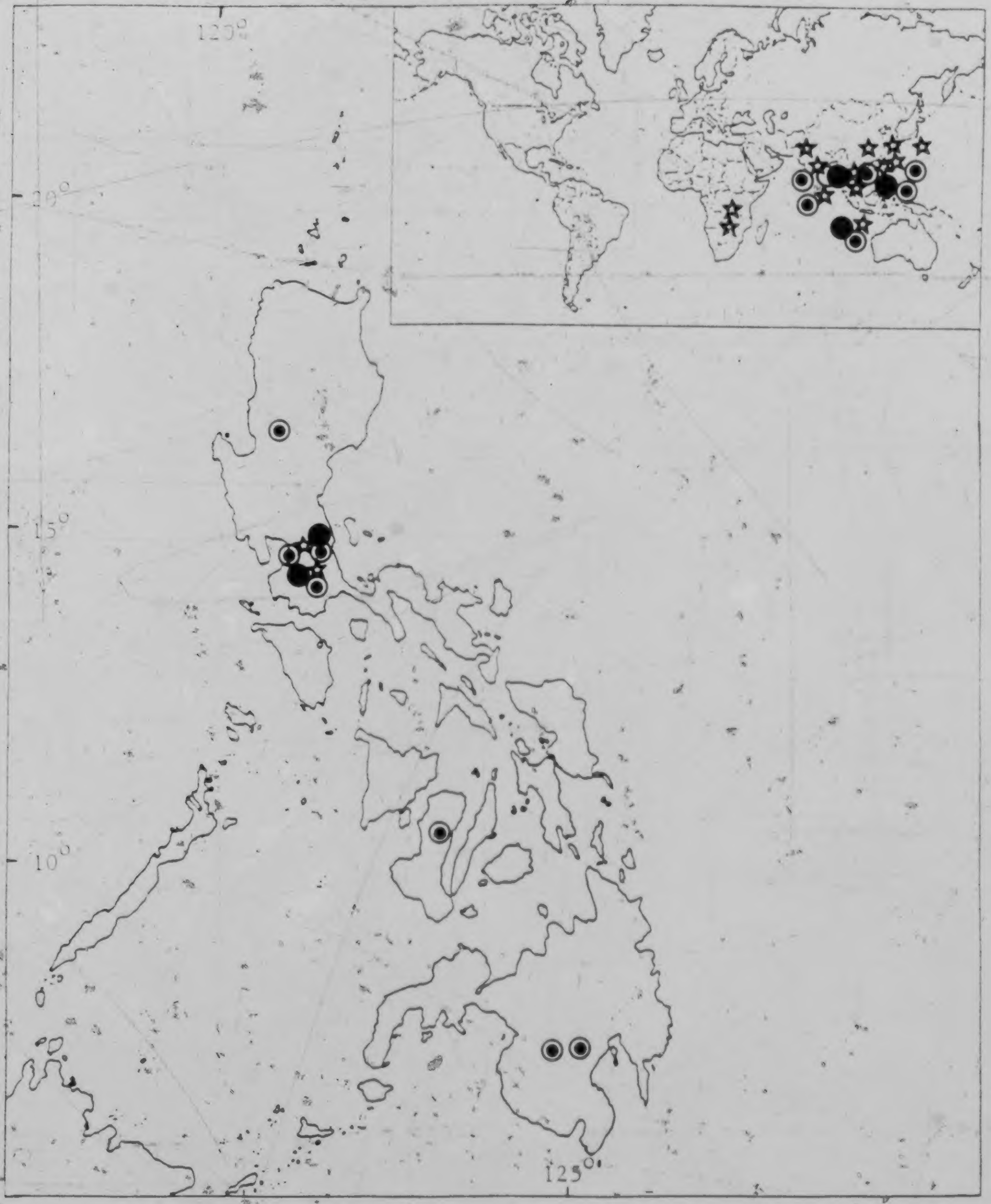
Hosts. This species sometimes occurs in large numbers and cause discoloration of leaves of plants (Takahashi, 1936). This species was also collected from the following: leaves of "banyan" tree, *Sarcocephalus orientalis*, *Boobenia*, *Terminalia catappa*, leaves of *Eugenia jambolana*, *Rosa* sp., *Suzygium cuminii*, leaves of *Ricinus communis*, leaves of *Lagerstonia* sp., *Bixa orellana*, *Sandoricum koetjape*, ; flower of "aguingay", grape vine, *Jatropa curcas*, vine, mixed fern and grass, *Antidesma bunias*, *Lasianthus* sp., *Bischofia javanica*, *Bambusa* sp., grass, leaves of unidentified tree

Fig. 21. Distribution of *Phibalothrips peringueyi* (Faure), *Retithrips javanicus* Karny and *Rhipiphorothrips pulchellus* Morgan in the Philippines, and world.

☆ *Phibalothrips peringueyi* (Faure)

● *Retithrips javanicus* Karny

◉ *Rhipiphorothrips pulchellus* Morgan


120°
20°
15°
10°
125°

Genus *Selenothrips* Karny

Selenothrips Karny (as subgenus of *Heliothrips*) 1911a: 179.
Type species: *Physopus rubrocincta* Giard, by subsequent designation of Hood, 1913a.

Diagnosis. Head transversely oblong, slightly depressed into pseudocollar posteriorly. Ocelli large, widely spaced, borne on slightly swollen and broad hump. Preocellar setae small; interocellar setae in front of posterior ocelli. Antennae 8- segmented; segments III and IV vasiform, each with forked sense cone; microtrichia absent. Maxillary palpi 2-segmented. Mouthcone short, rounded.

Pronotum twice as wide as long, with developed setae. Tarsi 1- segmented. Forewings with costal setae developed; posterior fringe cilia wavy; surface of wing covered with transverse rows of microtrichia. Mesoscutum entire. Metascutellar triangle with two, strong, median setae.

Abdominal tergites with polygonal reticules on lateral thirds; median pair of setae well developed. Posterior half of intermediate tergites with microtrichia particularly on tergite VIII. Posterior margin of tergite VIII with complete comb of long teeth. Tergites IX and X smooth, X entire.

Selenothrips is pantropical in distribution with only 2 species known (Mound and Houston, 1987). *S. rubrocinctus* is a serious pest of cacao in South America.

Selenothrips rubrocinctus (Giard)
Physopus rubrocincta Giard, 1901:264.
Neotype female, French West Indies: Guadeloupe (USNM) [examined]
Selenothrips rubrocinctus (Giard) Moulton, 1936:263.

Diagnosis. Body brownish black. Head and abdomen generally reticulate; thorax striate. Ocellar hump broad. Antennal segment IV strongly vasiform. Legs bicolored. Forewings brown, with subbasal pale area; costal setae dark, longer than anterior fringe cilia. Mesoscutal sculpture entire. Metascutal median sculpture in form of broad triangle. Abdominal tergites IV to VIII with scattered microtrichia on posterior half. B1 setae on tergite IX stout, dark, longer than tergite X.

Female macroptera. Head oblong, constricted into pseudocollar posteriorly; transverse reticules smooth, with 3 or 4 small wart-like tubercles beyond eyes. Ocellar hump small. Ocelli large. Ocellar and postocular setae well developed. Antennal segments I, II, apical half of V and VI brown; median third of III and IV light brown; remainder of III, IV and V light yellow; VII and VIII pale yellow; segment III and IV with forked sense cones, IV strongly vasiform, tubular apically. Mouthcone rounded.

Pronotum small, rectangular; about 2 times as wide as long; sculpture of distinct, closely spaced, transverse striae; discal setae developed. Femora brown; fore and midtibiae with pale apices; hindtibiae pale on apical third; tarsi whitish. Forewings brown, with small pale subbasal area; surface with transverse rows of microtrichia; costal setae dark, longer than anterior fringe cilia; anterior and posterior veins with complete row of developed, dark setae; posterior fringe cilia wavy; scale brown. Mesoscutal sculpture entire. Metascutal median sculpture in form of broad triangle, transversely striate on anterior half; median setae well developed. Metascutellum rectangular with circular striae. Abdominal tergite I smooth on median half. Tergites II to VIII hexagonally reticulate except median third smooth; median setae gradually longer on posterior tergites. Posterior half of tergites IV to VIII with scattered microtrichia. Posterior margin of tergite VIII with complete comb of long microtrichia. Tergite IX and X smooth; B1 setae on tergite IX longer than segment X, stout, dark, pointed at apex.

Male macroptera. Similar to female in structure and color. Abdominal tergite IX with longitudinal row of tubercles and 3 pairs of thorn-like setae; anterior pair thickened, median pair thinned. Sternites III to VII each with small glandular area medially.

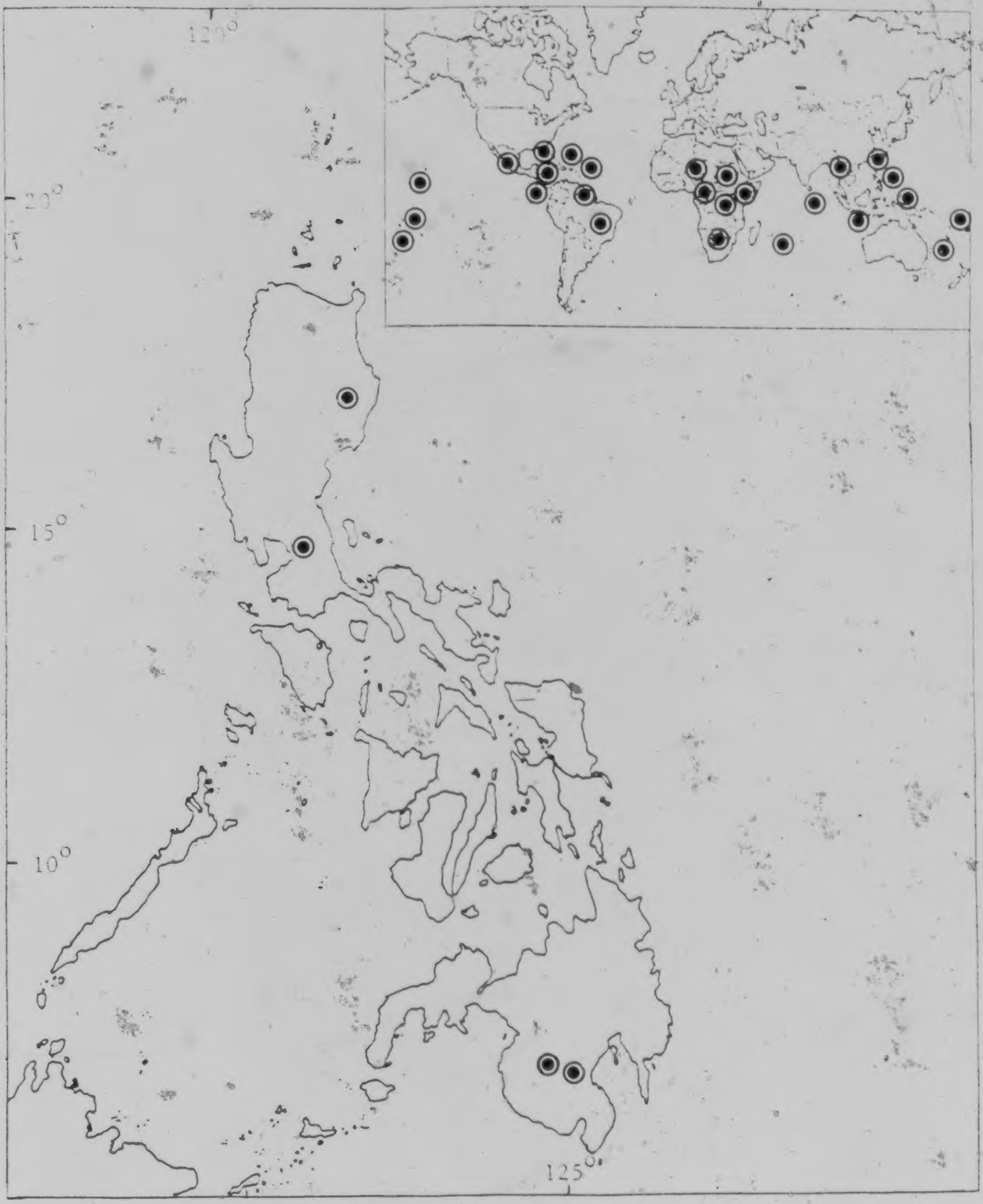
Material examined. 1 female, Manila, on grass, 7-VII- 1931, I.D. Dobrosky (**CASC**); 1 female, 5 males, 6 immatures, Ilagan, Isabela, on *Psidium guajava*, 1-III-1988, E. C. Mituda; 2 females, Mlang, North Cotabato, on leaves of "San Juan" leaves, 11-V-1989, C. P. Reyes; 1 female, on leaves of Avocado plant, 16-V-1987, C. P. Reyes; 7 females, on *Bixa orellana*, 11-V-1987, C. P. Reyes; 1 female, on *Plumiera acutifolia* 11-V-1987, C. P. Reyes; 8 females, 5 males, Agko, Mt. Apo, on flowers of unknown shrub, 5-VI-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 22). This species is widespread in the new and old world tropics. In the Philippine Archipelago, this species is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: Manila; Ilagan, Isabela; Mindanao: Mlang, North Cotabato; Agko, Mt. Apo. INDONESIA. TAIWAN. BANGLADESH. THAILAND. SRI LANKA. JAPAN. INDIA. SAIPAN. CHINA. BURMA. GUAM. PAPUA NEW GUINEA. SOLOMON IS. MOEN IS. MARIANA IS. SAIPAN. TRUCK IS. NEW CALEDONIA . SOUTH AFRICA. ANGOLA. WEST AFRICA. GHANA. KENYA. TANGANYIKA. UGANDA. MAURITIUS. HONDURAS. BRAZIL. COSTA RICA. PUERTO RICO. BRITISH GUIANA. SURINAM. PANAMA. FRENCH WEST INDIES. GRENADA. ANTILLES. U.S.A: Hawaii Is., Florida. MEXICO.

Hosts. *S. rubrocinctus* infest leaves and flowers of mango plant in the Philippines (Capco, 1957) . This species is known as the "cacao thrips" in view of the very serious damage it causes to cacao plantations in the West Indies and Ghana (Ananthakrishnan, 1973). *S. rubrocinctus* is also often reported as a serious pest of mango, cashew and cause spotting on banana fruits (Wilson, 1975). This species was also collected from the following: grass, *Psidium guajava*, leaves of "San Juan", leaves of Avocado plant, *Bixa orellana*, *Plumiera acutifolia*, flowers of unknown shrub, tomato plant, sweeping grass in coffee grove, leaves of oak, *Coffea arabica*, *Diospyros kaki*, *Codiaeum variegatum*, dry leaves, on numerous plants.

Fig. 22. Distribution of *Selenothrips rubrocinctus* (Giard) in the Philippines, and world.

◉ *S. rubrocinctus* (Giard)


120°
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125°

Key to genera of the Philippine Thripinae

1. Metathoracic furca enlarged, lyre-shaped; median tergal setae of abdomen close together 2

1' Metathoracic furca not enlarged and lyre-shaped; median tergal setae of abdomen not close together 3

2(1) Forewings with anterior fringe cilia inserted ventrally far from costal margin (Fig. 31d); pronotum without transverse apodeme .... *Dendrothrips* Uzel

2' Forewings with anterior fringe cilia inserted from costal margin; pronotum with transverse apodeme .... *Pseudodendrothrips* Schmutz

3(1') Abdominal tergites and sternites with numerous microtrichia (Fig. 43e, f) 4

3' Abdominal segments without numerous microtrichia 5

4(3) Abdominal tergites II -VI with median pairs of setae not similarly placed, setal length gradually increased from anterior to posterior ..... *Neohydatothrips* John

4' Abdominal tergites II to VI with median pair of setae similarly placed, setae of equal length; pronotum covered with numerous transverse striae of variable density .... *Scirtothrips* Shull

5(3') Pronotum trapezoidal .... *Chirothrips* Haliday

5' Pronotum rectangular 6

6(5') Abdominal tergite VIII with comb of long microtrichia or dentate projections; pronotum without especially long setae .... *Anaphothrips* Uzel

6' Abdominal tergite VIII with or without comb of microtrichia; pronotum with long setae, at least the posteroangulars (Fig. 24a) 7

7(6') Abdominal tergites and sternites with distinct postmarginal flanges 8

7' Abdominal tergites and sternites without distinct postmarginal flanges and with or without sculpture 12

8(7) Mesothoracic and metathoracic spinulae absent; preocellar setae 2 to 4 pairs .... *Exothrips* Priesner

8' Mesothoracic spinula present; preocellar setae 1 to 2 pairs 9

9(8') Stippled area around spiracles on abdominal tergite VIII greatly enlarged; pronotum with 5 pairs of posteromarginal setae .... *Chaetanaphothrips* Priesner

9' Stippled area around spiracles of abdominal tergite VIII small 10

10(9') Antennal segments III and IV each with very stout, forked sense cone; mouthcone long .... *Craspedothrips* zur Strassen

10' Antennal segments III and IV each with a slender, forked sense cones 11

11(10') Mouthcone very long, beak-like (Fig. 59a) .... *Tusothrips* Bhatti

11' Mouthcone broad, conical .... *Danothrips* Bhatti

12(7') Ovipositor reduced in females; antennal segments IV to VI greatly enlarged in males .... *Plesiothrips* Hood

12' Ovipositor developed in females; antennal segments IV to VI not enlarged in males 13

13(12') Sense cones on antennal segments III and IV simple; forewings banded .... *Bolacothrips* Uzel

13' Sense cones on antennal segments III and IV forked; forewings with or without bands 14

14(13') Abdominal tergites II to IX with transverse rows of large, trichoid processes originating from V-shaped cuticular thickenings (Fig. 29e) .... *Dendrothripoides* Bagnall

14' Abdominal tergites II to IX without trichoid processes 15

15(14') Forewings with anterior vein fused to costal vein in basal third; abdominal tergite IX of male with pair of dagger-like setae followed by row of tubercles .... *Ayyaria* Karny

15' Forewings with anterior vein not fused to costal vein; abdominal tergite IX of male variable 16

16(15') Abdominal tergite VIII with microtrichia anteriad spiracle; meso and metasternal spinulae present, degenerated or absent on metasternum 17

16' Abdominal tergite VIII with or without microtrichia; metasternal spinula absent 19

17(16) Pronotum with 4 pairs of posteromarginal setae, posteroangular setae long (Fig. 33c) .... *Filipinothrips*, n. gen.

17' Pronotum with 5 pairs of posteromarginal setae with or without long posteroangular setae 18

18(17') Metascutum with transverse sculpture; forewings with posterior vein with 4 setae .... *Ranjana* Bhatti

18' Metascutum with reticulate sculpture; forewings with posterior vein with 10 to 20 setae ....*Dichromothrips* Priesner

19(16') Abdominal tergites V to VIII with ctenidia laterally; antennae 7 to 8-segmented 20

19' Abdominal tergites V to VIII without ctenidia; antennae 8-segmented 24

20(19) Abdominal tergite VIII with ctenidia anterior to spiracle; forewings with anterior vein with complete row of setae .... *Frankliniella* Karny

20' Abdominal tergite VIII with ctenidia posterior to spiracle; forewings with anterior vein with row of setae broadly interrupted 21

21(20') Abdominal tergites with prominent scallops or teeth on posterior margin 22

21' Abdominal tergites with or without teeth on posterior margin 23

22(21) Head unusually small; tergites with developed scallop-like projections on posterior margins .... *Microcephalothrips* Bagnall

22' Head normal; tergites and sternites with large, triangular teeth on posterior margins .... *Fulmekiola* Karny

23(21') Preocellar setae much longer than interocellar setae (Fig. 48a); postocular setae biserial with number II behind the level of number III .... *Stenchaetothrips* Bagnall

23' Preocellar setae shorter than interocellar setae (Fig. 54a); postocular setae usually in one row .... *Thrips* Linnaeus

24(19') Ocellar setae pair 1 present; pronotum with 6 to 7 pairs of posteromarginal setae including those at angle 25

24' Ocellar setae pair I absent; pronotum with 5 pairs of posteromarginal setae including those at angle 27

25(24) Preocellar setae arranged in a longitudinal row; posterior margin of abdominal tergite VIII with long, fine comb of microtrichia .... *Lefroyothrips* Priesner

25' Preocellar setae not arranged in row; posterior margin of abdominal tergite VIII with comb of microtrichia interrupted medially 26

26(25') Abdominal tergite VIII without microtrichia anterior to spiracles; pronotum with 6 sometimes 7 pairs of posteromarginal setae (Fig. 24c) .... *Ceratothrips* Reuter

26' Abdominal tergite VIII with scattered microtrichia anterior to spiracles; pronotum with 7 pairs of posteromarginal setae .... *Megalurothrips* Bagnall

27(24') Abdominal sternite VII of female with all posteromarginal setae inserted along posterior margin; sternites III to VII of male with subcircular glandular areas .... *Dorcadothrips* Priesner

27' Abdominal sternite VII of female with all or some posteromarginal setae inserted anterior of posterior margin 28

28(27') Abdominal sternites III to VIII of male with numerous small circular glandular areas; tergites VI and VII with S4 setae reduced; preocellar setae more than 1 pair (Fig. 58a) .... *Trichromothrips* Priesner

28' Abdominal sternites III to VIII of male each with transverse glandular area (Fig. 37f); tergites VI and VII with S4 setae not reduced; preocellar setae in both sexes often 1 pair (Fig. 37a) .... *Javathrips* Bhatti

Genus *Anaphothrips* Uzel
Anaphothrips Uzel, 1895: 142.
Type species: *Anaphothrips virgo* Uzel, a synonym of *Thrips obscura* Muller, by subsequent designation of Hood,1914.

Diagnosis. Head wider than long. Ocellar setae pair I present. Postocular setae uniserial. Antennae 8 -to 9- segmented, with forked sense cone on segments III and IV; segment II with dorsal seta basad campaniform sensillum.

Pronotum wider than long, without especially long setae on angles. Tarsi 2-segmented. Macropterous or brachypterous. Forewings of macropterous form with a row of anterior vein setae broadly interrupted; posterior vein with 6-11 setae; posterior fringe cilia wavy. Mesosternal spinula present. Metasternal spinula absent.

Abdominal tergites and sternites without postmarginal flanges. Median pair of setae on abdominal tergites II-IX minute and wide apart. Pleurites with distinct posterior projections. Campaniform sensilla on tergites variously placed, either far ahead of or close to posterior margin. Tergite VIII with comb of long, prominent microtrichia or with dentate projections on posterior margin. Tergite X divided longitudinally. Sternite II with 2 pairs of primary setae, III-VII with 3 pairs, all inserted at posterior margin except for pair S1 on sternite VII in female; accessory setae absent. Sternites III-VI or VII in males each with oval, crescentic, or C-shaped glandular area. Tergite IX with 2 pairs of short, stout, thorn-like setae.

There are about 80 species presently included in the genus *Anaphothrips* (Mound and Walker, 1982). All of these feed on grass leaves often within the sheath. Some species are distributed worldwide and are minor pests of cereals.

Anaphothrips sudanensis Trybom

Anaphothrips sudanensis Trybom,1911:1-4.
Syntype female, Sudan: South of Kaka, White Nile (**Rijksmuseum**) [not examined]
Anaphothrips piercei Moulton, 1936: 265.

Diagnosis. Body bicolored. Head brown, transversely striate posteriorly. Ocellar and postocular setae small. Pronotum yellowish or brownish; angles without prominent setae. Legs bicolored. Forewings clear to pale yellow, with dark cross band before middle. Mesonotum transversely striate. Metascutum transversely reticulate. Abdominal tergites bicolored. Tergite VIII with long, dentate microtrichia. B1 setae on tergite IX longer than tergite X, dark, pointed at apex. Adults of *A. sudanensis* are variable in body color.

Female macroptera. Head brown; transversely striate posteriorly. Ocellar and postocular setae small. Antennal segments I, II and VI to VIII brown; segments III and IV yellow each with a forked sense cone. Mouthcone elongate, broadly rounded.

Pronotum yellowish or brownish; angles without prominent setae. Legs predominantly yellowish except femora slightly shaded with brown. Forewings clear to pale yellow, with dark cross band before middle; subapex clear or faintly shaded; vein setae short; posterior fringe cilia straight; scale yellowish. Meso and metanota light or dark brown, or orange brown. Mesonotum transversely striate. Meso and metasternal spinulae absent. Metascutum transversely reticulate; median setae behind anterior margin. Meso and metasternal spinulae absent.

Abdominal tergites I and II light to dark brown or light orange; III to IV or III to VI yellow; VII to X brown. Tergite VIII with long, dentate microtrichia. B1 setae of tergite IX dark, longer than tergite X, pointed at apex; B2 setae slender, pale, short. Tergite X with B1 setae dark, developed.

Male brachyptera. Similar to female in structure. Unicolored or bicolored. Tergites IX and X brown. Tergite IX with 2 pairs of short, stout, thorn-like setae, anterior pair stouter. Sternites III to VII each with C-shaped glandular areas.

Material examined. **Holotype** female, *A. piercei* Moulton, PHILIPPINES: Panocuy, Bacolod, Negros Occidental, on "limba-limba" grass, 21-VIII- 1929, W.D. Pierce (Moulton Coll.) (**CASC**); 3 females, Pansol, Calamba, Laguna, on *Zea mays*, 7-22-1987, C. P. Reyes; 2 females, VISCA, Baybay, Leyte, host unknown, 22-V-1984, C. P. Reyes; 1 female, 2 males, trail to peak 1, Mt. Pangasugan, Baybay, Leyte, in forest litter, 24-V-1984, R. S. Raros; 4 females, Victorias, Negros Occidental, on *Saccharum officinarum*, 26-V-1987, C. P. Reyes; 3 females, 1 male, La Granja, La Carlota, Negros Occidental, sweeping grass, 26-V-1987, C. P. Reyes; 1 female, on *Panicum maximum*, 16-V-1985, C. P. Reyes; 1 female, Agko, Mt. Apo, on flower of *Saccharum spontaneum*, 4-V-1987, C. P. Reyes (**CPRC**); 5 females, 1 male, Manila, taken in quarantine at Hawaii, on grass, 30-IV-1959, H. A. Woolford (**USNM**).

Distribution (Fig. 23). This species is widespread in the new and old world tropics. In the Philippine Archipelago, this species is known from the three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: Manila, taken in quarantine at Hawaii; Pansol, Calamba, Laguna; Visayas: Bacolod, Negros Occidental; VISCA, Baybay, Leyte; trail to Peak 1, Mt. Pangasugan, Baybay, Leyte; Victorias, Negros Occidental; La Granja, La Carlota, Negros Occidental; Mindanao: Agko, Mt. Apo. INDONESIA: Java; Sumatra. CENTRAL ASIA. TAIWAN. INDIA. SRI LANKA. AUSTRALIA. NEW BRITAIN. NEW CALEDONIA. TRANSVAAL. MOSAMBIQUE. USBEKESTAN. CYPRUS. PALESTINE. SUDAN. EGYPT. MOROCCO. SOMALIA. PUERTO RICO. CUBA.

Hosts. This species is mainly associated with grasses. This species is known as a pest of wheat in India (Ananthakrishnan, 1973). According to Ananthakrishnan, concentrated feeding of adults and larvae of *A. sudanensis* resulted in the whitening of the leaves of the wheat plant, or in severe cases resulted in complete bleaching of the leaf blades. In Pescadores Islands [Taiwan], this species attacks flowers and leaves of sorghum (Takahashi, 1936). This species was also collected from the following: "limba-limba"

grass, *Zea mays*, in forest litter, grass, *Saccharum officinarum*, sweeping grass, *Panicum maximum*, leaves of *Saccharum spontaneum*, galls on *Homalomena aromatica*, arrowroot, cholam, *Panicum barbinode*, *Panicum turgidum*, *Panicum colonum*, *Panicum crusgalli*, *Scirpus* sp., *Andropogon portusus*, *Polypogon monspeliensis*, *Triticum* sp., *Setaria italica*, *Setaria sphacelata*, *Oryza sativa*, *Raphanus sativus*, *Nicotiana tabacum*, *Lawsonia inermis*, *Zea mays*, *Pennisetum typhoideum*, *Pennisetum clandestinum*, *Urochloa brachyura*, *Themeda triandra*, *Lycopersicum lycopersicon*, *Citrus* sp., *Osyris compressa*, *Cynodon dactylon*, *Sorghum vulgare*, *Sorghum halepense*, *Imperata cylindrica*, *Eragrostis abyssinica*, *Hordeum vulgare*, *Phalaris paradoxa* , on Graminae, *Setaria italica*, *Sorghum bicolor*.

Genus Ayyaria Karny
Ayyaria Karny, 1927: 193.
Type species: *Ayyaria chaetophora* Karny, by monotypy.

Diagnosis. Head wider than long. Eyes large, about half length of head. Ocelli close together; ocellar setae pair I present; interocellar setae long, prominent. Postocular setae developed, pair II and III short. Antennae long, slender, 8 -segmented; segments III , IV and VI elongate, III clearly constricted at base and apex. Maxillary palpi 2- segmented. Mouthcone elongate, narrowly rounded to almost pointed.

Pronotum wider than long, without markings; anteromarginal and posteroangular setae long and prominent. Legs slender; hindcoxae placed close together. Forewings long, slender, and with 2 large, submedian cross bands, and pointed at apex; anterior vein fused with costa in basal third, with interrupted setae; posterior vein with 3 setae; posterior fringe cilia wavy. Mesonotum transversely striate medially. Metascutum smooth medially, with longitudinal striations laterally.

Abdomen elongate. Tergites I-VII with polygonal reticulations. Tergite VIII with well developed comb of microtrichia on posterior margin. Tergite X entire. Sternites without accessory setae. Males with thorn-like setae borne on tubercles on tergite IX.

Adult *Ayyaria* are medium-sized, brown thrips distinguished by their long interocellar setae, long antennae, and slender, banded forewings. Only *A. chaetophora* is known in the genus and representatives occur in the Philippines.

***Ayyaria chaetophora* Karny**
Ayyaria chaetophora Karny, 1927: 193-194.
Holotype female, India: Taliparamba, Malahar (SMFG)[examined]
Bussothrips claratibia Moulton, 1935: 475.

Diagnosis. Body brown. Head transversely striate on posterior half. Interocellar setae about as long as eyes, inserted inside ocellar triangle. Antennal segments III to VIII slender, elongate. Pronotum smooth; discal setae developed. Legs bicolored. Forewings pale with 2 dark cross bands; vein setae dark, strong. Mesonotum transversely striate. Metascutum smooth medially. Abdominal tergites II to VIII reticulate on anterior half. Tergite IX about 2 times as long as tergite X; B2 setae inserted almost posteromedially, pointed at apex.

Female macroptera: Head wider than long; transversely striate on posterior half. Interocellar setae about as long as eyes, placed inside ocellar triangle. Postocular setae well developed. Antennae more than 2 times as long as head; segments I and II globular; III to VIII slender, elongate; III and IV yellow with brown apices and each with forked sense cone. Mouthcone elongate, narrowly rounded.

Pronotum smooth; discal and major setae well developed; anteromarginal setae longer than anteroangulars; outer pair of posteroangular setae slightly longer than inner pair. Femora brown; foretibiae faintly shaded with brown; mid and hindtibiae whitish; tarsi whitish. Forewings pale, with 2 dark cross bands; vein setae dark, developed; anterior vein with 10 long, developed setae; posterior vein with only 3 setae; posterior fringe cilia wavy. Mesonotum transversely striate. Metascutum with faint transverse reticulation anteriorly, smooth medially, slightly reticulate laterally; median setae small, placed behind anterior margin. Meso and metasternal spinulae present.

Abdominal tergite I transversely reticulate. Tergites II to VIII reticulate on anterior half, smooth on posterior half. Tergite VIII with comb of long microtrichia on posterior margin. Tergite IX long, about 2 times as long as tergite X; B1 setae dark, pointed at apex; B2 setae placed almost posteromedially, pointed at apex.

Male macroptera. Similar to female in structure but smaller in size. Body color lighter. Tergite IX with thorn-like setae. Sternites without glandular areas.

Material examined. **Holotype** female, *Bussothrips claratibia* Moulton, PHILIPPINES: Singalong, Manila, on cotton (*Gossypium* sp.), October 29,1934, F. Q. Otanes and Jose S. Camus, (Moulton Coll.); **Paratypes** (1 female, 1 male) same data as holotype. Others: 1 female, Los Banos, Laguna, on leaves of pink flowering cotton (*Gossypium* sp.), 9-VII- 1931; 1 female, Los Banos, Laguna, on grass, 22-VII-1931; 1 female, Los Banos, Laguna, on legume, 20-X-1931, I. D. Dobrosky (Moulton Coll.) (**CASC**); 2 females, Sipit Saburan, Puerto Gallera, Oriental Mindoro, on Malvaceae and on *Citrus* sp., 19-VI-1987, C. P. Reyes; 1 female, 1 male, VISCA, Baybay, Leyte, on on flower of unknown grass and on leaves of *Codiaeum variegatum*, 13-V-1987, C. P. Reyes; 1 female, FORI, Camp Susana, La Paz, Zamboanga, on leaves of *Ageratum*, 12-VII-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 23). The known range of this species extends from India eastward in the Solomon Islands to the Caribbean Islands. In the Philippine Archipelago, this species is known from the three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: Singalong, Manila; Los Banos, Laguna; Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro; VISCA, Baybay, Leyte; Mindanao: Camp Susana, La Paz, Zamboanga. INDIA. THAILAND. MALAYSIA. BANGLADESH. TAIWAN. JAPAN. HAINAN (?TAIWAN). NEW HEBRIDES. SOLOMON IS. TAHITI. PUERTO RICO. PERU. TRINIDAD.

Hosts. Adults and larvae of this species commonly feed on the undersurface of the leaves of beans and cotton in Taiwan (Takahashi, 1936). *A. chaetophora* is also known as a pest of jute (Jacot-Guillarmod, 1974). This species was also collected from the following: grass, legume, Malvaceae, *Citrus* sp., flower of unknown grass, leaves of Codiaeum *variegatum*, leaves of *Ageratum*, *Ipomoea* sp., *Crataeva* sp., leaves of *Ficus cariea* , *Manihot utillissima*, *Manihot glazovii*, leaflets of *Glycine max*, *Theobroma cacao*, flowers of *Vigna catjan*, *Ricinus* sp. shoots, grass, herb, leaf of *Gossypium* sp., *Canavalia ensiformis*, *Gossypium indicum*, *Dolichos lablab*, *Ricinus communis*, *Acalypha* sp., "Dudhakado", jute, on Leguminosae

Genus *Bolacothrips* Uzel
Bolacothrips Uzel, 1895: 211.
Type species: *Bolacothrips jordani* Uzel, by monotypy.
Bolacidothrips Priesner; Mound and Palmer, 1981a: 159.

Diagnosis. Head longer than wide; vertex slightly produced between eyes. Ocellar setae pair I absent; interocellar setae vestigial. Postocular setae developed, but not in a row. Antennae 7- or 8-segmented, slender, with simple sense cones on segments III and IV. Maxillary palpi 2-or 3-segmented.

Pronotum wider than long, major setae developed; anteromarginal and posteroangular setae long, midlateral setae moderately long. Macropterous. Forewings broad, banded or not; anterior vein with few or complete row of setae; posterior vein with about 12 setae. Mesosternal spinula present. Metasternal spinula absent. Metanotal median setae usually not at anterior margin.

Abdominal tergites V-VII with paired lateral ctenidia, on VIII anterior of spiracles. Comb of microtrichia on posterior margin of tergite VIII present or absent. Tergites V-VII with B2 seta not reduced. Tergite X divided in basal half. Sternites III-VIII with accessory setae.

Adult *Bolacothrips* are slender bodied, uniformly or bicolored, grass feeding thrips having unbanded or banded wings. About 10 species are included in this genus known mainly from the orient (Ananthakrishnan, 1966; Jacot-Guillarmod, 1974; Priesner, 1930b; Mound and Houston, 1987). A specimen of *B. graminis* from the Philippines was taken in quarantine in Los Angeles, California.

Bolacothrips graminis (Priesner)
Bolacidothrips graminis Priesner, 1930b: 6-8.
Holotype female, Egypt: Giza (**SMFG**) [examined]

Diagnosis. Body yellow. Head and thorax deep yellow; abdomen variable, pale or darkened laterally. Preocellar setae developed; interocellar setae minute. Antennal segments slender, bicolored. Pronotal posteromarginal setae 6 pairs. Forelegs bicolored; mid and hindlegs yellow. Forewings with or without defined dark cross band. Abdominal tergite VIII without microtrichia on posterior margin.

This species includes 2 subspecies: *graminis* (Priesner) and *indicus* (Ananthakrishnan) (Ananthakrishnan, 1966). Since a single specimen only is known from the Philippines, and given the variability of individuals within this species, I did not attempt to place this specimen in a subspecies.

Female macroptera. Head longer than wide. Preocellar setae developed; interocellar setae minute. Postocular setae developed; pair no.III longest. Antennae about 1.5 times as long as head, with slender segments; segments III and IV each with simple, moderately stout sense cones; segments IV to VII colored variously, from pale to dark brown. Mouthcone broadly rounded.

Pronotum wider than long; major setae developed; anteroangular setae about as long as midlaterals; posteromarginal setae 6 pairs; inner pair of posteroangulars longer than outer pair. Legs predominantly yellowish; forefemora shaded with brown. Forewings with or without defined dark cross band; anterior vein with or without complete row of setae.

Abdominal tergite VIII without comb of microtrichia on posterior margin. Tergite X pale or dark, not completely divided longitudinally. Sternites III to VIII with 7 to 8 pairs of of accessory setae, nearly arranged in 2 rows.

Male. Similar to female in structure but paler in color. Not known in the Philippines.

Material examined. 1 female, Philippines: Manila, taken in quarantine at Los Angeles, on *Cymbopogon* sp. (**USNM**).

Distribution (Fig. 23). The known range of this species extends from Egypt eastward in India, to the Philippine Archipelago. In the Philippines, this species is known from the island of Luzon. PHILIPPINES: Luzon: Manila, taken in quarantine at Los Angeles. INDIA. EGYPT.

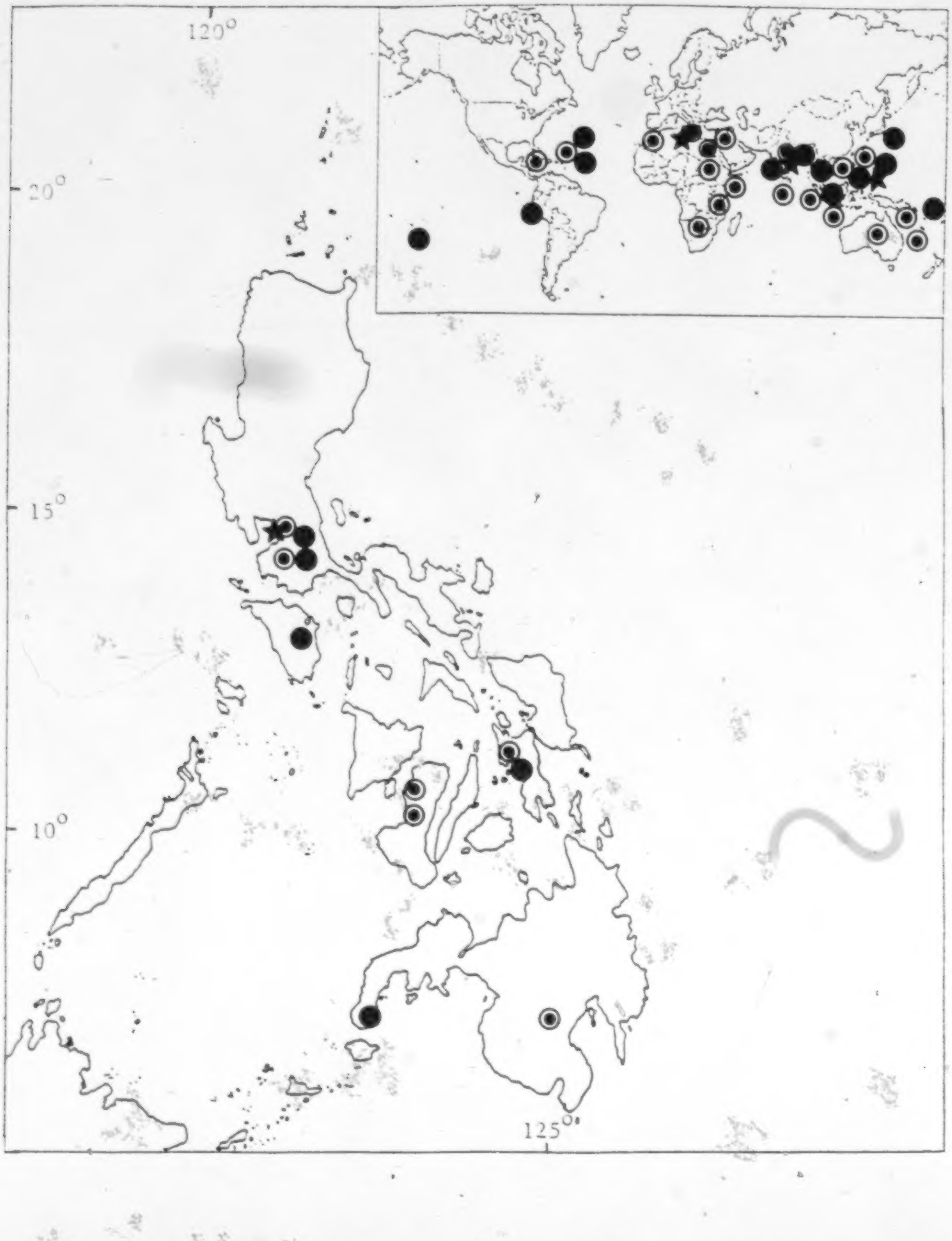
Hosts. *Cymbopogon* sp., wheat, cat's tail grass, *Sorghum vulgare*, *Polypogon monspeliensis*, *Cynodon dactylon*, *Panicum colonum*, *Imperata cylindrica*, *Zea mays*, *Phragmites communis*, *Saccharum officinarum*, *Scirpus* sp., *Bambusa* sp. spindles, wild [sugar]cane sheaths, grass

Fig. 23. Distribution of *Anaphothrips sudanensis* Trybom, *Ayyaria chaetophora* Karny and *Bolacothrips graminis* (Priesner) in the Philippines, and world.

◉ *Anaphothrips sudanensis* Trybom

● *Ayyaria chaetophora* Karny

★ *Bolacothrips graminis* Priesner


120°
20°
15°
10°
125°

Genus *Ceratothrips* Reuter

Ceratothrips Reuter, 1899:65
Type species: *Ceratothrips trybomi* Reuter, a synonym of *Thrips ericae* Haliday, by monotypy.

Diagnosis. Head wider than long, with transverse striations posteriorly. Ocellar setae pair I present, pair III long, about 3.0 times as long as pair II, inserted on anterolateral margins of ocellar triangle. Eyes large, more than half of head length. Antennae 8-segmented; segments III and IV each with forked sense cone.

Pronotum narrowly rounded, with 7 pairs of posteromarginal setae; 4 pairs of setae mesad of posteroangular setae; posteroangular setae long. Legs without tooth; tarsi 2-segmented. Forewings with long interval in setal row on anterior vein; posterior vein with complete row of small setae; posterior fringe cilia wavy. Mesonotum with transverse striae. Mesosternal spinula present. Metasternal spinula absent.

Tergite VIII with complete or incomplete comb of microtrichia. Tergite X completely or not completely divided longitudinally. Sternites without accessory setae. Males with glandular areas on sternites VI-VII; thorn-like setae absent from tergite IX .

Ceratothrips species are similar to those of *Lefroyothrips* spp. and *Megalurothrips* spp. in having long interocellar setae, ocellar setae pair I present, metasternal spinula absent, and tergite VIII with comb of microtrichia. Adults of *Ceratothrips* differ from those of these genera in their pronotal and forewing chaetotaxy, and by lacking scattered lateral microtrichia on abdominal tergite VIII. There are about 9 species included in this genus, of which 2 are known from the Philippines (Bhatti, 1978a; Mound and Walker, 1982).

Key to Philippine species of *Ceratothrips* Reuter

1	Abdominal tergite VIII without comb on posterior margin; mid and hindtibiae dark brown	*C. allia* (Moulton)
1'	Abdominal tergite VIII with comb on posterior margin; mid and hindtibiae pale yellow	*C. reticulatus*, n. sp.

Ceratothrips allia (Moulton)
Taeniothrips allia Moulton, 1936:267.
Holotype female, Philippines: Manila(CASC) [examined]

Diagnosis. Body dark brown. Head slightly wider than long. Interocellar setae short, inserted outside ocellar triangle. Antennae predominantly brown; segment III yellowish brown. Posteromarginal setae of pronotum with pair no. III longest. Forefemora, mid and hindtibiae dark brown; foretibiae brownish yellow; tarsi yellow. Forewings brownish yellow; anterior vein with 2 distal setae. Metascutum with median setae inserted behind anterior margin. Abdominal tergite X not completely divided longitudinally.

C. allia is known only from the holotype specimen. Bhatti (1978a) temporarily transferred this species to the genus *Ceratothrips* Reuter.

Female macroptera. Head slightly wider than long; transversely striate posteriorly. Interocellar setae short, inserted outside ocellar triangle. Postocular setae developed; pair II placed back of pair I. Antennal segments I, II, IV to VII dark brown; segment III yellowish brown and subequal to segment IV, each with forked sense cone; segment VI longer than III; segments VII and VIII subequal. Mouthcone rounded.

Pronotum rounded on posterior angles; posteromarginal setae mesad to angulars 4 pairs, pair III longest; posteroangular setae with inner pair longer than outer pair. Forefemora dark brown; foretibiae brownish yellow; mid and hindtibiae dark brown; tarsi yellow. Forewings shaded with brownish yellow; anterior vein with 7 basal and 2 distal setae; posterior vein with 10 to 11 setae. Metascutum with median setae behind anterior margin.

Abdominal tergite VIII with out comb of microtrichia on posterior margin. Tergite X nearly completely divided longitudinally.

Male. Unknown

Material examined. **Holotype** female, PHILIPPINES: Manila, on flowers of onions, 27-V- 1931, I. D. Dobrosky (Moulton Coll.) (**CASC**).

Distribution (Fig. 25). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Manila.

Host. flowers of onions

***Ceratothrips reticulatus*, n. sp.**
Holotype female, Philippines: Luzon: Taguig, Rizal (**UPLB**)
Figure 24a, b, c, d, e

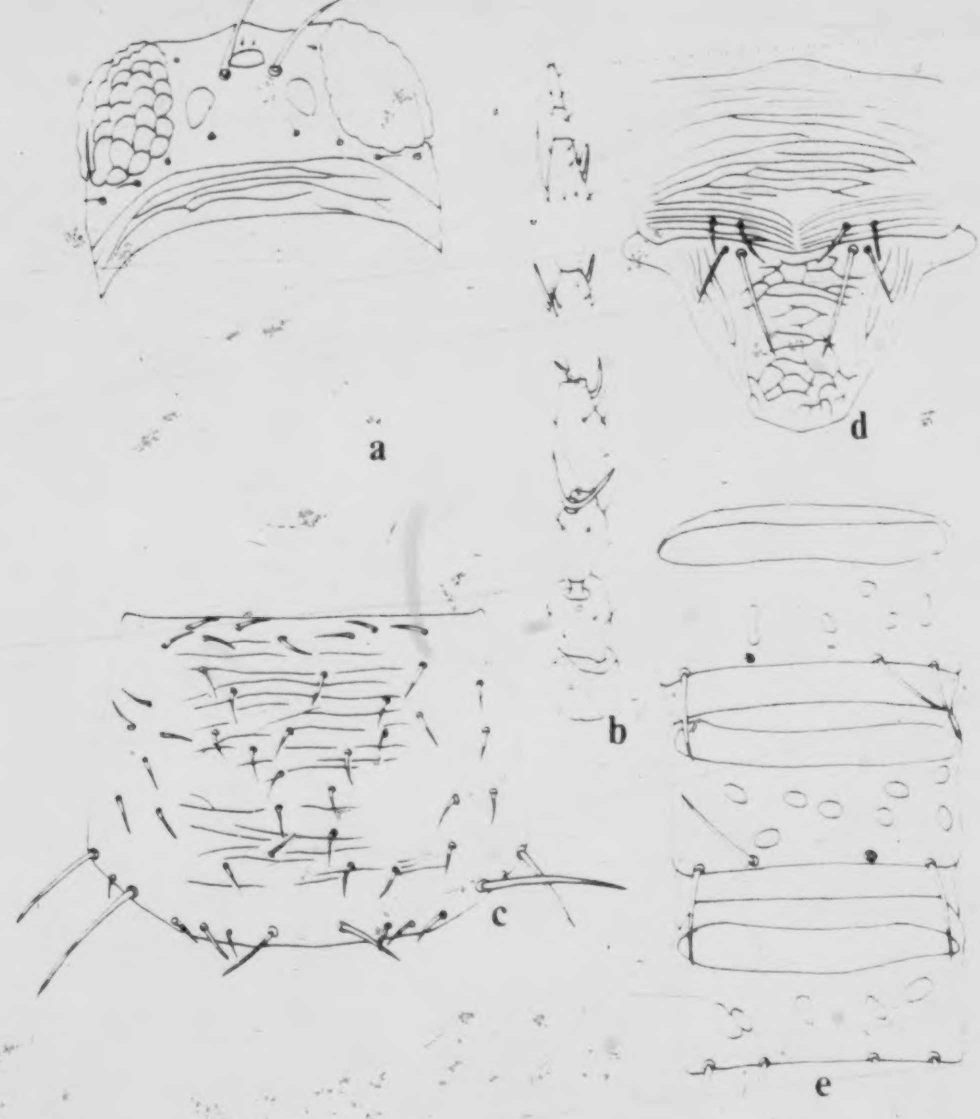
Diagnosis. Body brown. Head and pronotum with transverse striae. Interocellar setae longer than length of eyes. Postocular setae small. Antennal segments III and IV yellow, each with short, forked sense cone; sense cone on IV inserted ventrally. Four pairs of pronotal posteromarginal setae mesad to angulars. Legs bicolored brown and yellow. Forewings pale, lightly shaded with brown medially; anterior vein with 2 distal setae. Metascutum transversely reticulate medially, longitudinally striate laterally. Abdominal tergite VIII with complete comb of developed microtrichia on posterior margin.

Members of this species differ from those of the Australian species, *C. frici* (Uzel) in having unshaded forewings, in the shape and color of antennal segments, and in the sculpture of the metascutum.

Female macroptera. Head wider than long, with transverse striae posteriorly (Fig. 24a). Interocellar setae longer than length of eyes, within ocellar triangle. Eyes more than half of head length. Postocular setae small. Cheeks smooth. Antennal segments I II, V to VIII brown; base of V yellowish; segments III and IV yellowish, each with small, forked sense cone; sense cone on IV inserted ventrally (Fig. 24b). Mouthcone elongate, rounded (Fig. 24a).

Pronotum transversely striate; discal setae developed; posteromarginal setae mesad to angulars 4 pairs (Fig. 24c). Femora brown, with pale apices; foretibiae, bases and apices of mid and hindtibiae yellow; all tarsi yellow. Forewings pale, lightly shaded with brown medially; vein setae pale; anterior vein with 2 distal setae; posterior vein with complete set of setae; posterior fringe cilia wavy. Mesonotum with transversely anastomosing striae (Fig. 24d). Metascutum transversely reticulate medially; longitudinally striate laterally; median setae inserted near anterior margin; campaniform sensilla absent (Fig. 24d).

Fig. 24. *Ceratothrips reticulatus*, n. sp., female holotype. a. Head b. Right antenna c. Pronotum d. Meso and metascutal sculpture e. Male allotype, abdominal sternites V to VII


a
b
c
d
e

Abdominal tergites faintly striate. Tergite VIII with sparse microtrichia anterior to each spiracle; posterior margin with complete comb of well developed microtrichia. B1 and B2 setae of tergites IX developed, B1 about 3 times as long as B2. Tergite X not completely divided longitudinally; B1 setae shorter than those on tergite IX.

Dimensions (holotype female; um): Body length (extended) 1339.6. Head length 98.6 , median width 125.8; interocellar setae length 47.6; postocular setae pair I length 10.2; dorsal eye length 61.2; antennal segments length I 23.8; II 35.7; III 47.6; IV 44.2; V 37.4; VI 45.9; VII 8.5; VIII 15.3. Pronotum length 120.7, median width 166.6, major setae length: pm 25.5; pa I 51; pa II 40.8.

Type data. **Holotype** female, PHILIPPINES: Luzon: Taguig, Rizal, on *Datura* sp., 7-VII-1987, C.P.Reyes (**UPLB**). **Paratypes** (4 female, 1 male) same data as holotype (**UPLB**).

Male macroptera. Similar to female in color and structure but smaller. Abdominal tergite VIII without sparse microtrichia anterior to spiracle. Tergite IX without thorn-like setae. Sternites III to VII each with a transversely elongate glandular area anteriorly and many oval or circular glandular areas behind (Fig. 24e).

Dimensions (allotype male; um). Body length (extended) 1013.2. Head length 59.5, median width 108.8; interocellar setae length 34; postocular setae pair I length 10.2; dorsal eye length 44.2; antennal segments length 20.4; II 28.9; III 35.7; IV 34; V 30.6; VI 42.5; VII 8.5; VIII 10.2. Pronotum length 100.3, median width 127.5, major setae length: pm 23.8; pa I 47.6; pa II 37.4.

Material examined. Type series only (**UPLB**).

Etymology. Reticulatus is a Latin word meaning "reticulate or netted" in reference to the metascutal median sculpture of these thrips.

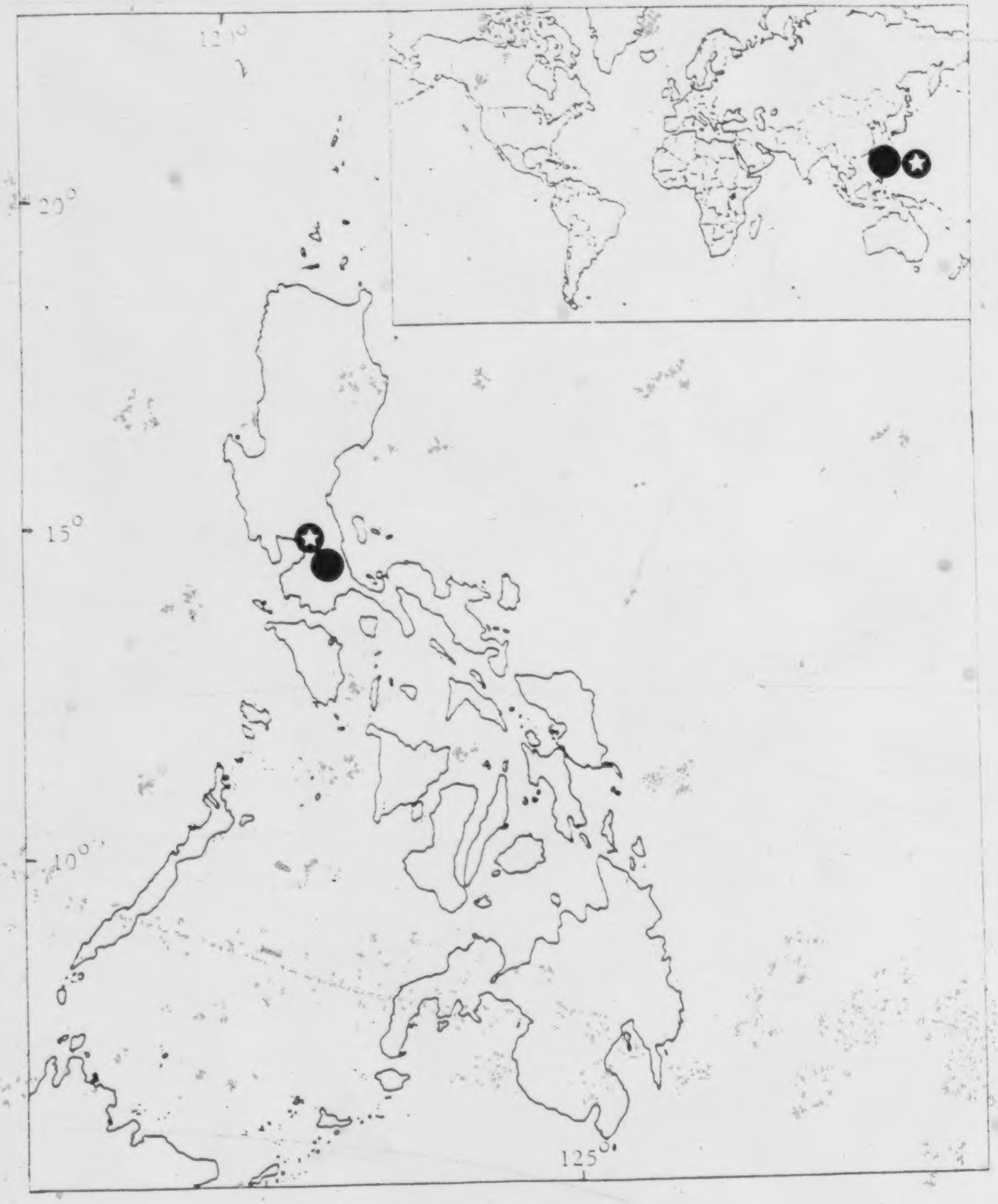
Distribution (Fig. 25). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Taguig, Rizal.

Host. Adults of this species were found feeding on the undersurface on the leaves of *Datura* sp. growing on the roadside.

Fig. 25. Distribution of *Ceratothrips* species in the Philippines.

✪ *C. allia* Moulton

● *C. reticulatus*, n. sp.


120°
20°
15°
10°
125°

Genus *Chaetanaphothrips* Priesner
Chaetanaphothrips Priesner,1925a: 145.
Type species: *Euthrips orchidii* Moulton, by monotypy.

Diagnosis. Head wider than long. Antennae 8- segmented, with forked sense cone on each of segments III and IV; segment I without middorsal setae at apex; segments IV to VI with whorls of microtrichia. Maxillary palpi 3-segmented. Mouthcone broadly conical.

Pronotum with 5 pairs of posteromarginal setae; 1 or 2 setae at each posterior angle developed. Tarsi 2- segmented. Forewings with bases of anterior vein setae distinctly enlarged at least in middle of wing; costal setae near apex short; apical seta at least 5 times as long as preapical seta; some microtrichia on basal part of wing reduced to granules; posterior wing fringe cilia wavy. Mesepimeron with dense covering of microtrichia. Mesosternal spinula present. Metasternal spinula absent.

Postmarginal flanges on abdominal tergites and sternites present in both sexes. Pleurite with teeth or lobes posteriorly. Stippled area around spiracles on abdominal tergite VIII enlarged in both sexes. Tergite X divided longitudinally in females. Males with transverse, sternal glandular areas.

Chaetanaphothrips is closely related to *Danothrips*. Adults of the former can be distinguished from those of the latter by the presence of prominent, posteromarginal flanges on abdominal tergites and sternites and by transverse glandular areas on sternites III-VII of males. There are 13 species included in this genus (Kudo, 1985).

Key to Philippine species of *Chaetanaphothrips* Priesner

1 Posteroangular setae long; abdominal tergite IX of male with pair of dark, horn-like processes.. *C. signipennis* (Bagnall)

1' Posteroangular setae minute; abdominal tergite IX of male with thorn-like setae.. *C.* sp. Sakimura

Chaetanaphothrips signipennis (Bagnall)
Scirtothrips signipennis (Bagnall), 1914a: 22.
Holotype female, Sri Lanka: Peradenya (**TMNH**) [examined]
Chaetanaphothrips signipennis (Bagnall), Pitkin, 1977: 602-603.

Diagnosis. Body yellowish brown. Head transversely striate posteriorly. Preocellar setae pair no. I placed in line with anterior margin of foreocellus. Antennae predominantly yellowish except proximal segments brownish to greyish; segments V and VI each with very long, inner sense cone. Pronotal posteromarginal setae pair no. III prominent. Legs and forewing yellow. Mesonotum transversely striate. Metascutum longitudinally reticulate. Abdominal tergites slightly sculptured laterally. Tergite VIII with stippled area reaching antecostal line and extended slightly mesially along it. Females of this species are peculiar in having a glandular area on sternite VIII.

Female macroptera. Head longer than wide; transversely striate posteriorly. Preocellar setae pair no. I placed in line with anterior margin of foreocellus; interocellar setae inside ocellar triangle. Postocular setae 5 pairs, developed. Antennae predominantly yellowish; segments V and VI brownish apically; VII and VIII greyish; III and IV each with long, forked sense cone; V with inner sense cone much longer than outer sense cone; VI with inner sense cone extended to base of segment VIII; VIII elongate, about 1.8 times as long as VII. Mouthcone broadly rounded.

Pronotum wider than long; discal setae small; anteroangular setae about as long as anteromarginals; posteromarginal setae 5 pairs, pair no. III prominent. Legs yellow; forefemora slightly enlarged; inner margin of foretibiae with spine-like setae at apex. Forewings yellowish; anterior and posterior vein setae pale; posterior fringe cilia wavy; scale yellow. Mesonotum transversely striate. Metascutum longitudinally reticulate; median setae behind anterior margin.

Abdominal tergites faintly sculptured laterally. Tergite VIII with stippled area extended to antecostal line, and extended slightly mesially along it. Tergites IX and X with B1 setae long, blunt at apex. Sternite VIII with transverse glandular area medially.

Male macroptera. Similar to female in structure. Abdominal tergite IX with a pair of dark, thorn-like setae borne on a single tubercle. Abdominal sternites III to VIII each with transverse glandular area.

Material examined. 1 female, Tugbok, Davao City, on *Musa sapientum* suckers, C. Stephens (**TMNH**); 1 female, Calapnagan, La Castellana, Negros Occidental, on leaf of *Calocasia* sp., 14-V-1985, C. P. Reyes (**CPRC**).

Distribution (Fig. 26). The known range of this species extends from India eastward in the Pacific Islands, to Australia and South America. In the Philippine Archipelago, this species is known from the three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: Manila; Visayas: Calapnagan, La Castellana, Negros Occidental; Mindanao: Tugbok, Davao City. INDONESIA. FIJI. U.S.A.: Hawaii. PANAMA. TRINIDAD. BRAZIL. COSTA RICA. HONDURAS. INDIA. SRI LANKA. PAPUA NEW GUINEA. AUSTRALIA: Queensland.

Hosts. *C. signipennis* is a pest of bananas, causing rust in South America (Pitkin, 1977). This species is also collected from the following: *Anthurium*, leaf of *Calocasia* sp.

***Chaetanaphothrips* sp.**

Chaetanaphothrips sp. Sakimura, 1974: 322-323.

Diagnosis. *Chaetanaphothrips* sp. was reported by Sakimura (1974) based on 2 damaged specimens taken in quarantine at Hawaii from Manila. Since I was not able to examine these specimens, the present notes are based on that report.

This specimens approach *C. fasciatus* in having stippled areas extended to the antecosta on abdominal tergite VIII and by having 5 pairs of weak setae on the pronotal hindmargin. Unlike adults of *C. fasciatus*, those of *Chaetanaphothrips* sp. have forked sense cones on each of antennal segments III and IV. The male has thorn-like setae on tergite IX up to 80 microns, borne on a single tubercle.

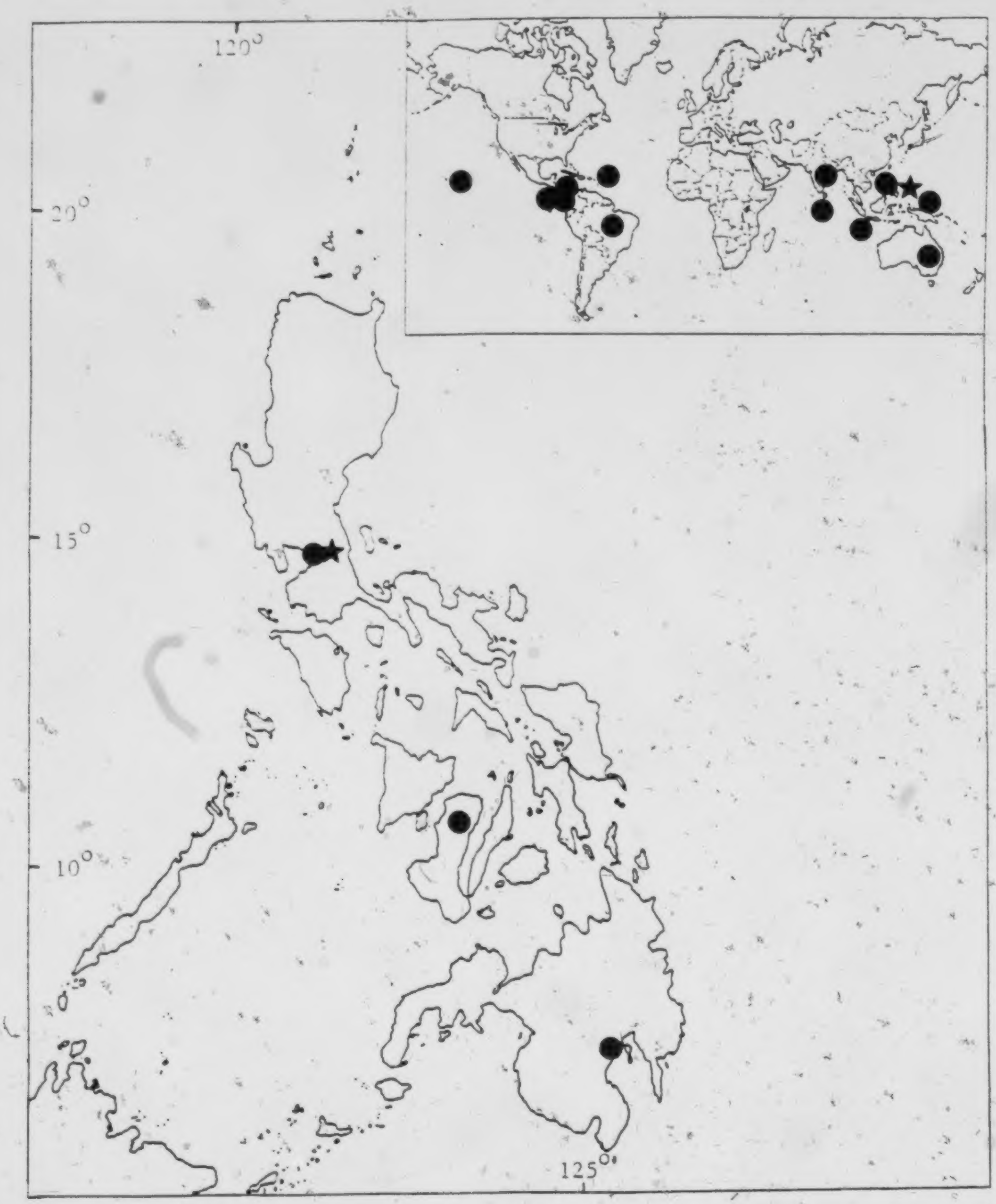
Distribution (Fig. 20). The known range of this species is confined to the Philippine Archipelago, where it is known from Luzon. PHILIPPINES: Luzon: Manila.

Host. orchid.

Fig. 26. Distribution of *Chaetanaphothrips* species in the Philippines and world.

● *C. signipennis* (Bagnall)

★ *Chaetanaphothrips* sp.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Genus *Chirothrips* Haliday
Thrips (*Chirothrips*) Haliday, 1836: 444.
Type species: *Thrips* (*Chirothrips*) *manicata* Haliday, by monotypy.

Diagnosis. Head small, usually prolonged behind eyes. Eyes proportionately large. Ocelli always present in female, usually absent in male, located on posterior half of head. Antennae 8- segmented; segment I usually enlarged; segment II usually produced at outer apex; segments VII and VIII forming a style; segment III with simple sense cone; IV with simple or forked sense cone. Maxillary palpi 3 -segmented. Labial palpi 2- segmented.

Pronotum trapezoidal, with epimeral setae usually well developed. Forelegs enlarged; tarsi 2- segmented. Females macropterous, male apterous or brachypterous. Anterior and posterior veins of forewings with interrupted setae; posterior fringe cilia wavy.

Abdominal tergite VIII without comb of microtrichia on posterior margin. Intermediate tergites with median setae placed far apart. Tergite X divided longitudinally. Sternites without accessory setae. Males with or without sternal glandular areas.

Chirothrips species are readily distinguished by their trapezoidal pronotum, enlarged forelegs, small head, and produced apex of the antennal segment II. Adults of *Chirothrips* feed within grass inflorescence. The genus includes about 65 species worldwide (Mound and Houston, 1987), of which *C. mexicanus* Crawford and *C. spiniceps* Hood are known from the Philippines. zur Strassen (1960) provided a key for the identification of about 50 known species of *Chirothrips*.

Key to Philippine species of *Chirothrips* Haliday

1. Foretibiae moderately produced on outer distal edge; vertex of head at most with 6 short setae in addition to interocular setae; abdominal tergites I to VI with transverse, scallop-like line .... *C. mexicanus* Crawford

1' Foretibiae simple, not produced on outer distal edge; vertex with 10 to 16 short setae in addition to interocular setae; abdominal tergites I to VI with pale stippled areas .... *C. spiniceps* Hood

Chirothrips mexicanus Crawford, D.L.

Chirothrips mexicana Crawford, D. L.: 1909: 114.
Holotype female, Mexico: Guadalajara (USNM) [examined]
Chirothrips mexicanus Crawford D.L.; Moulton, 1936: 264.

Diagnosis. Body dark brown. Head small; vertex with 3 pairs of stout setae. Antennal segment I enlarged; segment II produced at outer apical angle. Pronotal epimeral setae 2 pairs. Legs short, stout; foretibiae produced on outer apical angle. Forewings light brown, slender. Mesoscutum with shallow, scallop-like sculpture on anterior half. Metascutum longitudinally reticulate. Abdominal tergites I to VI with transverse, scallop-like sculpture on anterior third. B1 and B3 setae on tergite IX long, pointed at apex.

Female macroptera. Head small, longer than wide, slightly rounded at base; smooth; vertex with 3 pairs of stout setae. Antennal segment I brown, enlarged, bulbous; II produced at outer apical angle; segments II and III light brown; III and IV with simple sense cones. Mouthcone broadly rounded.

Pronotum broad, more than 2 times as long as head; discal setae short, slender; epimeral setae 2 pairs. Legs short, stout; forefemora enlarged, yellowish to yellowish brown; foretibiae brownish, produced on outer apical margin; mid and hind femora light brown, darker on lateral margins; all tarsi yellowish. Forewings slender, shaded with light brown; anterior vein setae few, pale, well developed. Mesoscutum with faint, scallop-like sculpture on anterior half. Anterior margin of mesosternum with 50 or more stout setae. Metascutum with longitudinal sculpture; median setae short. Metascutellum rectangular, reticulate on anterior half. Meso and metasterna without spinulae.

Abdominal tergites I to VI with transverse, scallop-like sculpture on anterior third. Tergite IX with long B1 and B3 setae, pointed at apex; B2 setae about .35 times as long as B1. Tergite X with B1 setae about as long as B2, pointed at apex. Sternites II to V with scallop-like sculpture.

Male aptera. Similar to female in sculpture. Body color lighter; apterous and without ocelli. Abdominal sternites II to VII each with circular or subcircular glandular area.

Material examined. 2 females, Luzon: Manila, on grass, June 26 and July 7,1931, I. D. Dobrosky (Moulton Coll.) (**CASC**); 4 females, 4 males, Bicutan, Taguig, Rizal, on unknown grass, 7-VII-1987, C. P. Reyes. . female, UPLB, Los Banos, Laguna, on *Lantana camara*, 14-X-1984, C. P. Reyes; 7 females, VISCA, Baybay, Leyte, on *Chloris barbata*, 22-V-1984, S. G. Reyes; 3 females, on *Chloris inflata*, 29-VI-1984, C. P. Reyes; 1 female, on flower of unknown grass, 13-V-1987, C. P. Reyes; 1 female, on *Vigna sinensis*, 5-V-1983, C. P. Reyes; 1 female, Mt. Pangasugan, Leyte, on flower of December plant, 6-V-1983, C. P. Reyes; 2 females, Mlang, North Cotabato, on leaves of *Musa sapientum*, 3-V-1987, C. P. Reyes (**CPRC**); 4 females, 4 males, VISCA, Baybay, Leyte, on *Eleusine indica*, 20-VI-1984, A. Almeroda; 1 female, 1 male, on *Chloris inflata*, 27-VI-1984, A. Almeroda; 4 females, trail to peak of Mt. Pangasugan, Leyte, 24-V-1984, A. Almeroda (**VISCA**).

Distribution (Fig. 27). This species is widespread in the new and old world tropics. In the Philippine Archipelago, this species is known from three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: Manila; Bicutan, Taguig, Rizal; UPLB, Los Banos, Laguna; Visayas: VISCA, Baybay, Leyte; Mt. Pangasugan, Leyte; trail to peak of Mt. Pangasugan; Mindanao: Mlang, North Cotabato. TAIWAN. THAILAND. AUSTRALIA. MIDWAY IS. SOUTHERN RHODESIA. TRANSVAAL. NATAL. MOSAMBIQUE. BRAZIL. ARGENTINA. MEXICO. COSTA RICA. PANAMA. CUBA. PUERTO RICO. DOMINICAN REPUBLIC. ST. THOMAS. ANTIGUA. MARTINIQUE. U.S.A. : Hawaii, Illinois, Georgia, Florida, Louisiana, Oklahoma, Texas, Arizona, California, Tennessee.

Hosts. This species is usually associated with the flowers of grasses. In the United States, *C. mexicanus* is a serious pest of Bermuda grass seed industry in Arizona (Jacot-Guillarmod, 1971). This species was also collected from the following: *Eleusine indica*, *Chloris inflata*, unknown grass, *Lantana camara*, *Chloris barbata*, *Nicotiana tabacum*, flower of unknown grass, *Vigna sinensis*, flower of December plant, leaves of *Musa sapientum*

Chirothrips spiniceps **Hood**
Chirothrips spiniceps Hood,1915a: 12
Holotype female, U.S.A.: Glendale, Arizona (USNM) [examined]

Diagnosis. Body brown. Head small; vertex with 7 to 16 pairs of short, stout setae. Antennal segment I greatly enlarged; segment II produced at outer apical angle. Pronotal epimeral setae 1 pair. Legs stout; foretibiae not produced apically. Forewings light brown, slender. Meso and metanota with scallop-like sculpture. Mesosternum nearly covered with small, stout setae. Abdominal tergites with anterior striae broken into stipple-like areas. B1 and B3 setae of tergite IX longer than B2, pointed at apex.

This is the first record of *C. spiniceps* in the Philippines. Based on the present distribution of this species, it is most likely that *C. spiniceps* was introduced to the Philippines from the Americas by man.

Female macroptera. Head small, longer than wide, slightly rounded at base; vertex with 7 to 16 pairs of short, stout setae. Shape and color of antennae similar to those of *C. mexicanus*; segment I greatly enlarged; II greatly produced at outer apical angle; III and IV each with simple sense cone. Mouthcone broadly rounded.

Pronotum broad, about 2 times as long as head; sculpture scallop-like; discal setae short; epimeral setae 1 pair. Legs short, stout; colored as in *C. mexicanus*; foretibiae not produced apically. Forewings slender, shaded with light brown; anterior vein setae few, pale, well developed. Meso and metascuta with scallop-like sculpture; median setae developed. Mesosternum nearly covered with small, stout setae. Metascutellum rectangular, faintly reticulate.

Abdominal tergites with anterior striae broken into pale, stipple-like areas. Tergite IX with B1 and B3 setae long, pointed at apex; B2 setae shorter. Tergite X with B1 setae about as long as B2, pointed at apex. Sternites with shallow transverse striae.

Male brachyptera. Similar to female in general structure. Body color paler. Ocelli absent. Abdominal sternites III to VII each with oval glandular areas (Stannard,1968). Not known in the Philippines.

Material examined. **Paratypes** (10 females), Glendale, Arizona, 4 to 6-X-1913, on sugarcane (*Saccharum officinarum*), H. M. Russell (**CASC**); 6 females, La Granja, La Carlota, Negros Occidental, on flowers of *Panicum maximum*, 16-V-1985, C. P. Reyes (**CPRC**).

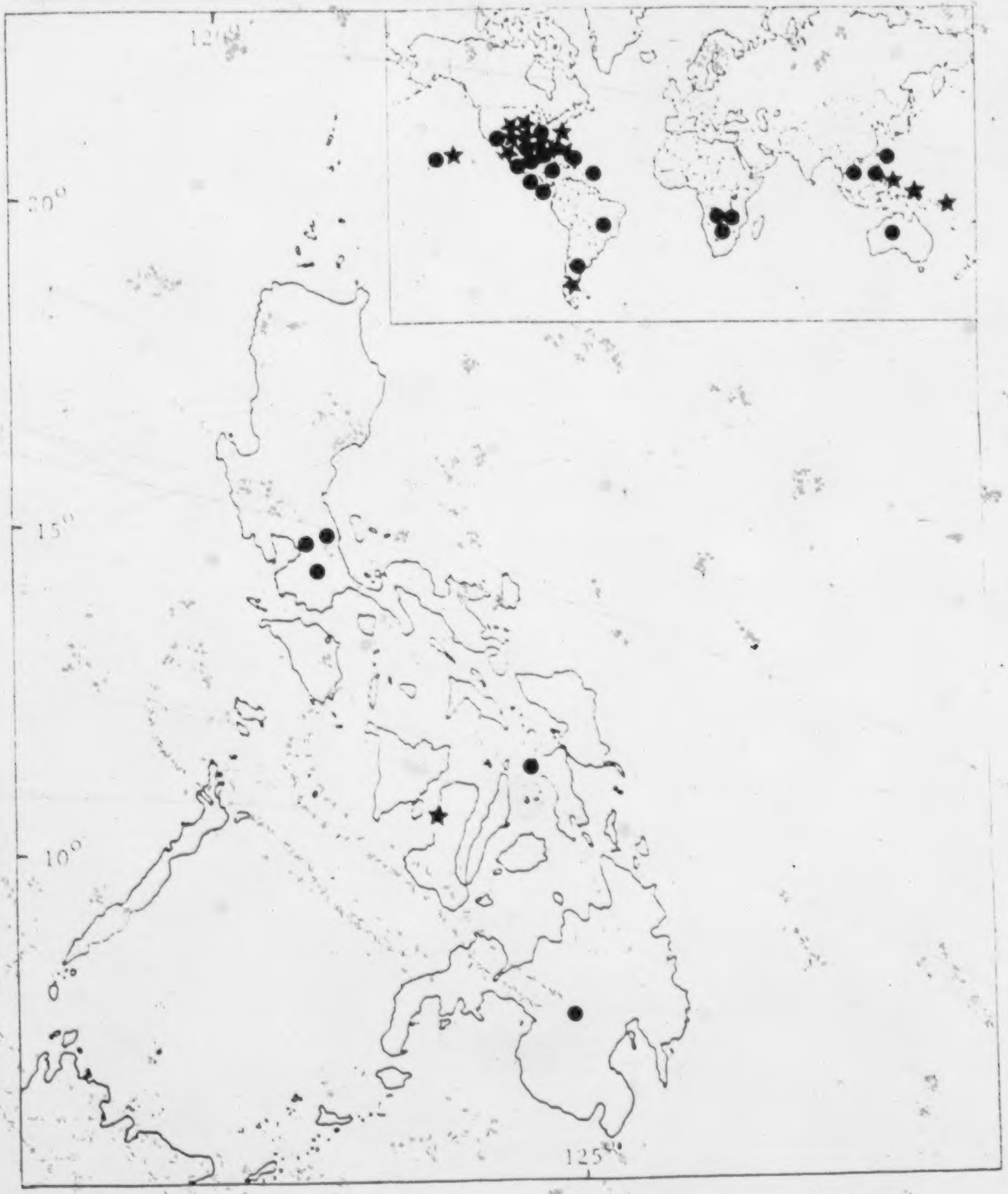
Distribution (Fig. 27). This species is widespread in the new world tropic. The known range extends from the Americas to the Pacific Islands. In the Philippine Archipelago, this species is known from the island of Visayas. PHILIPPINES: Visayas: La Granja, La Carlota, Negros Occidental. PAPUA NEW GUINEA. SOLOMON IS. MEXICO. CUBA. ARGENTINA. U.S.A.: Hawaii, Arizona, Texas, Louisiana, Florida, Kansas, Oklahoma, North Carolina, Illinois, Virginia, New Jersey, California, South Dakota, Utah, Massachusetts, South Carolina.

Hosts. flowers of *Panicum maximum*, *Panicum coloratum*, *Panicum virgatum*, *Saccharum officinarum*, privet, *Bambusa* sp., *Setaria geniculata*, moss, *Echinocloa crusgalli*, *Cynodon dactylon*, grass, lupine, *Zea mays*, *Oryza sativa*, various grasses

Fig. 27. Distribution of *Chirothrips* species in the Philippines, and world.

● *C. mexicanus* Crawford

★ *C. spiniceps* Hood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Genus *Craspedothrips* zur Strassen

Craspedothrips zur Strassen, 1966: 444-445.
Type species: *Physothrips hargreavesi* Karny, by original designation and monotypy.

Diagnosis. Head wider than long with transverse striae posteriorly. Ocellar setae pair I present. Antennae 8-segmented, about 2.5 times as long as head or longer; segment I with a pair of dorsal apical setae; III and IV each with stout, forked sense cone; V with 2 or 3 stout, simple sense cones; VIII elongate. Maxillary palpi 3-segmented. Mouthcone long and pointed, extended to posterior margin of prosternum.

Pronotum longer than wide with major setae developed; posteroangular setae subequal in length. Forewings shaded with brown, with small pale area at base; anterior vein with 2 distal setae; apical seta long. Mesosternal spinula present. Metasternal spinula absent.

Abdominal tergites and sternites with postmarginal flanges. Posterior margin of tergite VIII with comb of microtrichia. Tergites IX-X with long setae; X incompletely or completely divided longitudinally. Sternal accessory setae absent.

Adults of *Craspedothrips* are easily recognized by the postmarginal flanges on abdominal tergites and sternites of females, by a pair of dorsal apical setae on antennal segment I, segments IV to VI enlarged and bearing numerous long setae in the males, and by 3 major sense cones on antennal segment V. Three species are included in this genus (Bhatti, 1978a).

***Craspedothrips minor* (Bagnall)**
Physothrips minor Bagnall, 1921:393.
Holotype female, India: Maddur, Mysore (**TMNH**) [examined]

Diagnosis. Body brown. Head transversely striate posteriorly. Interocellar setae developed and inserted close to each other inside ocellar triangle. Antennal segments III and IV each with stout, forked sense cone; segment IV vasiform. Pronotal setae developed; posteromarginal setae 6 pairs. Legs bicolored. Forewings brown; basal fifth pale; anterior vein with 2 distal setae. Metascutum transversely reticulate medially. Abdominal tergite VIII with or without lateral sparse comb of microtrichia on posterior margin. Tergite IX with B1 setae dark, well developed.

Bhatti (1978a) redescribed *C. minor* based on his study of Indian and Indonesian specimens.

Female macroptera. Head small, wider than long; transversely striate posteriorly. Interocellar setae well developed, stout, placed inside ocellar triangle. Postocular setae small. Antennae more than 2 times as long as head; brown; segment III pale in some individuals; III and IV each with stout, forked sense cone; IV vasiform. Mouthcone elongate, pointed.

Pronotum longer than wide, transversely striate; discal and major setae developed; posteromarginal setae 6 pairs; posteroangular setae with inner pair longer than outer pair. Femora brown; foretibiae yellowish, shaded with brown at base; apices of mid and hindtibiae and all tarsi pale. Forewings shaded with brown, basal fifth pale; vein setae dark; anterior vein with 2 distal setae; scale pale. Mesosternal spinula present. Metascutum transversely reticulate medially; longitudinally striate laterally; median setae placed near anterior margin.

Abdominal tergite I transversely striate. Tergites II to VII smooth medially, striate laterally. Tergite VIII with pair of ctenidia laterally; posterior margin with or without sparse comb of microtrichia laterally. Tergite IX with B1 setae dark, longer than tergite X, with pointed apices. Sternites without accessory setae.

Male macroptera. Similar to female in structure, rare in nature. Not known in the Philippines.

Material examined. 1 female,VISCA, Baybay, Leyte, on "anubing" tree, 13-V-1987, C. P. Reyes; 1 female, Agko, Mt. Apo, on flower of unknown shrub, 5-V-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 28). The known range of this species extends from India eastward to the Indonesia Archipelago. In the Philippine Archipelago, this species is known from the islands of Visayas and Mindanao. PHILIPPINES: Visayas: VISCA. Baybay, Leyte; Mindanao: Agko, Mt. Apo. INDIA. BANGLADESH. INDONESIA : Sulawesi, Sumatra.

Hosts. "anubing" tree, flower of unknown shrub, *Ipomoea staphylina*, leaves of *Mirabilis jalapa* under a caster shrub, *Ricinus communis*, *Thunbergia fragrens*, *Impatiens balsamina*, sandal

Genus *Danothrips* Bhatti

Danothrips Bhatti, 1971b: 337-338.
Type species: *Danothrips setifer* Bhatti, by original designation and monotypy.

Diagnosis. Head wider than long. Ocellar setae pair I present. Maxillary palpi 3-segmented. Mouthcone short, broadly rounded.

Pronotum with 7 pairs of posteromarginal setae; posteroangular setae well developed. Tarsi 2- segmented. Forewings with series of anterior vein setae broadly interrupted; posterior vein with 4 setae; bases of veinal setae enlarged at middle of wing; costal setae near wing apex long; apical setae longer than preapical setae; microtrichia on surface of wings not reduced to granules basally; posterior fringe cilia wavy. Mesonotum with median and submedian pairs of setae inserted at same level and close to posterior margin. Metanotum with transverse sculpture in median fourth. Spinula on mesosternum present or absent in few taxa. Mesosternal spinula present. Metasternal spinula absent.

Abdominal tergites without lateral ctenidia. Tergites and sternites without postmarginal flanges, tergites with a short flange in few taxa. Microtrichia-bearing area around spiracles on tergum VIII moderately developed. Tergite X entire. Sternites without glandular areas. Male tergite IX with 1 or 2 pairs of stout, thick, thorn-like setae, arising from weakly elevated sockets.

Adult *Danothrips* are small to medium-sized, yellow, macropterous thrips, with or without greyish brown cross bands on the forewings. *Danothrips* is closely related to *Chaetanaphothrips* Priesner and their adults can be distinguished from those of the latter by the absence of posteromarginal flanges on abdominal sternites, and of glandular areas on those of males. There are 6 species included in this genus (Bhatti, 1980a).

Danothrips moundi Bhatti
Danothrips moundi Bhatti, 1980a: 547-558.
Holotype male, Philippines: Manila (TMNH) [examined]

Diagnosis. Body pale yellow with hyaline setae. Head slightly longer than wide. Antennal segments I to V pale yellow; VI greyish brown on apical half; VII and VIII greyish brown. Legs pale yellow. Forewings with stout, dark cross band medially; base brown; anterior vein with 3 distal setae. Metascutum sculptured; striae in whorled pattern on posterior half. Abdominal tergites II to VI with 2 to 3 stout teeth laterally. This species is known only from the holotype specimen.

Male macroptera. Head slightly wider than long, transversely striate posteriorly. Interocellar setae developed, inserted outside ocellar triangle. Postocular setae pair I to IV minute. Antennae more than 2 times as long as head; segments I to V pale yellow; VI greyish brown on apical half; VII and VIII greyish brown; III and IV each with forked sense cone; VIII elongate. Mouthcone broadly rounded.

Pronotum broad with small discal setae; 4 pairs of posteromarginal setae mesad to angulars; posteroangular setae with inner pair longer than outer pair. Legs pale yellow. Forewings with short, dark cross band medially; base brown; apical seta longer than preapical seta; bases of anterior and posterior vein setae at middle of wing enlarged; anterior vein with 7 basal, 3 distal setae; posterior vein with 4 setae; scale brown. Mesonotum transversely striate; median and submedian pairs of setae inserted near posterior margin. Metascutum slightly sculptured; striae in whorled pattern on posterior half; median setae inserted behind anterior margin; campaniform sensilla present.

Abdominal tergites covered with anastomosing striae. Tergites II to VIII with short, distinct, continuous postmarginal flanges with margins wavy. Tergites II to VI with 2 to 3 stout teeth laterally. S4 setae on tergites VI to VIII reduced. Tergite VIII with microtrichia anterior of lateral stippled areas about spiracles. Tergite IX with many short cuticular processes medially on posterior quarter; 2 pairs of short, thorn-like setae, with cuticular processes between them; anterior pair shorter than posterior pair. Sternites without glandular area. Sternites II to VIII indistinct scallop-like projections on posterior margin.

Female. Unknown.

Material examined. **Holotype** male, PHILIPPINES: Manila, on *Anthurium* sp., 16-X-1939, F.Q. Otanes (**TMNH**).

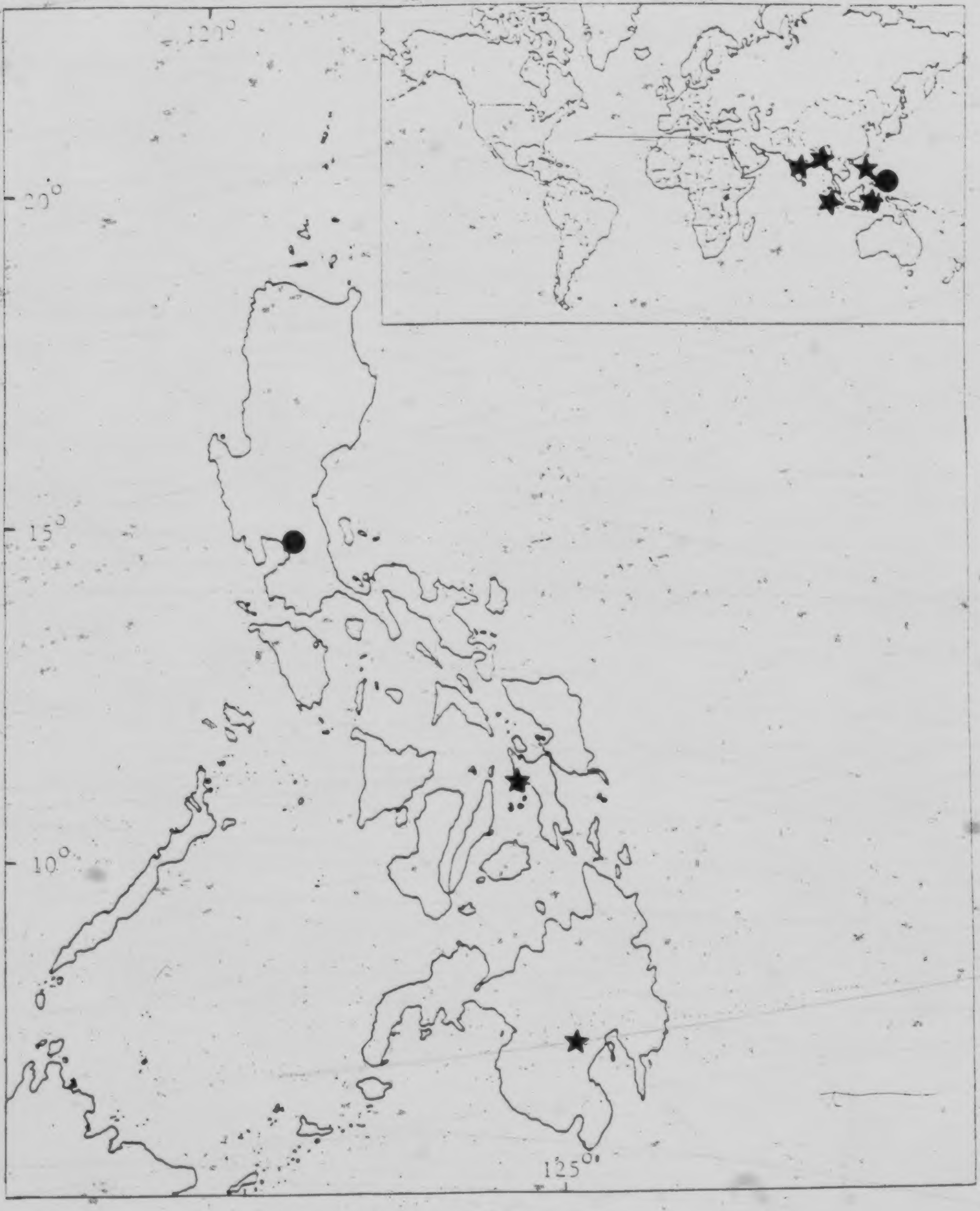
Distribution (Fig. 28). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Manila.

Host. *Anthurium* sp.

Fig. 28. Distribution of *Craspedothrips minor* Bagnall and *Danothrips moundi* Bhatti in the Philippines, and world.

★ *Craspedothrips minor* Bagnall

● *Danothrips moundi* Bhatti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Genus *Dendrothripoides* Bagnall

Dendrothripoides Bagnall, 1923: 624.
Type species: *Dendrothripoides ipomoeae* Bagnall, a synonym of *Euthrips innoxius* Karny, by original designation and monotypy.

Diagnosis. Head transverse with constricted, neck-like region. Cheeks deeply notched behind eyes, widest across middle. Antenna 8- segmented; segments III and IV each with forked sense cone. Mouthcone long and pointed.

Pronotum nearly smooth; pterothorax faintly reticulate. Legs moderately long, stout; tarsi 2- segmented. Forewings narrow, white with a median dark brown band, with small, leathery wart-like, pustules on basal third; veins thin; posterior fringe cilia wavy. Mesoscutum entire. Mesospinasternum broadly truncate.

Abdominal tergites II-IX with transverse rows of large, trichoid processes emerging from V-shaped, cuticular thickenings on lateral thirds; small median setae widely spaced, much enlarged posteriorly and lanceolate on tergite VIII. Tergites IX and X with spine-like apical setae. Tergite X completely divided. Males with pair of contiguous, dagger-like, median setae with common, protruding base on tergite IX. Sternites III-VII each with a small, linear, anteromedian glandular area in males.

Four species are presently included in this genus (Wilson,1975; Okajima, 1987a). A new species, *D. nakaharai*, is described from the Philippines.

Key to Philippine species of *Dendrothripoides* Bagnall

1. Pronotal posteroangles each with single short setae; abdominal tergites VI to VII with median pair of stout, sigmoidal setae; forewings with median dark band about one-fourth length of wing .... *D. innoxius* Karny

1' Pronotal posteroangles each with single long setae, slightly dilated at apices; abdominal tergites VI to VII with median pair of setae slender 2

2(1') Forewings brownish gray basally, medially and apically; body yellow .... *D. microchaetus* Okajima

2' Forewings brown, base with hyaline margins, subbasal area pale (Fig. 29d); body bicolored .... *D. nakaharai*, n. sp.

Dendrothripoides innoxius (Karny)
Euthrips innoxius Karny, 1914: 356.
Holotype female, Indonesia: Java(**SMFG**)[examined]
Dendrothripoides ipomoeae Bagnall; Kudo,1977: 4955-496.

Diagnosis. Body yellow with anterior quarter of head, median, posterior or lateral portions of metanotum and abdominal tergite I variously shaded with brown or yellow. Head transversely striate posteriorly. Interocellar setae placed inside ocellar triangle. Cheeks strongly expanded laterally. Antennae about 2 times as long as head; segments III and IV each with a small, dorsal forked sense cone. Legs yellow. Forewings yellow with subbasal and median dark patches. Abdominal tergite I reticulate. Tergite VIII with 2 pairs of stout, slightly curved median setae. Tergites IX and X smooth.

All specimens from the Philippines have blunt or expanded body setae, unlike the rest of the specimens known from elsewhere.

Female macroptera. Head reticulate anteriorly; transversely striate posteriorly behind collar. Ocellar setae minute; pair I ?absent; interocellar setae inside ocellar triangle. Postocular setae pair 1 developed. Cheeks expanded laterally; slightly incut behind eyes. Antennae about 2 times as long as head; predominantly yellowish; apical half of segments VI to VIII greyish brown; III pedicellate; III and IV each with a small, forked sense cone. Mouthcone long, narrow, extended to posterior margin of prosternum.

Pronotum wider than long; discal setae slender; posteroangular setae short, expanded at apex. Legs stout, yellowish. Forewings yellow, with dark, rounded, subbasal patch and narrow median cross band. Mesonotum reticulate on anterior half, reticulations anastomosed medially on posterior half. Metanotum reticulate medially, transversely striate laterally, median setae small, behind anterior margin. Mesosternal spinula present; metasternal spinula absent.

Abdomen moderately broad. Tergite I reticulate. Tergites II to VIII smooth, or with very faint reticulation medially and laterally. Median setae on tergites VI to VIII strong, sigmoidal, or simply curved. Tergite VIII with 2 pairs of stout, slightly curved, median setae; posterior margin without comb of microtrichia. Tergites IX and X smooth; B1 and B3 setae long and stout, pointed at apex.

Male macroptera. Similar to female in structure. Abdominal tergite IX with median pair of contiguous dagger-like setae borne on a single tubercle; mediolateral setae long, apices fan-shaped. Sternites III to VII each with small, anteromedian, linear glandular area. Apex of abdomen sometimes shaded with brown.

Material examined. 1 male, UPLB, Los Banos, Laguna, on *Musa sapientum*, 14-IX-1984, C. P. Reyes; 1 female, 1 male, UHP site, Pantabangan, Nueva Ecija, on Convulvulaceae, 6-IX-1976, C. P. Reyes; 6 females, on *Ipomoea triloba*, VISCA, Baybay, Leyte, 23-VI-1984, C. P. Reyes (**CPRC**); 3 females, VISCA, Baybay, Leyte, on *Bidens pilosa*, 13-VI-1984, A. Almeroda; 2 females, VISCA, Baybay, Leyte, on *Ipomoea triloba*, 23-VI-1984, A. Almeroda (**VISCA**).

Distribution (Fig. 30). This species is widespread in the new and old world tropics. In the Philippine Archipelago, this species is known the islands of Luzon and Visayas. PHILIPPINES: Luzon: taken in quarantine at Honolulu, Hawaii; Manila; Laguna; San Pablo City; UPLB, Los Banos, Laguna; UHP site, Pantabangan, Nueva Ecija; Visayas: VISCA, Baybay, Leyte. INDONESIA: Java. MALAYSIA. BURMA. TAIWAN. JAPAN. HONGKONG. INDIA. PAPUA NEW GUINEA. U.S.A: Hawaii. GUAM. FIJI. CANARY IS. COOK IS. BERMUDA. PANAMA. TRINIDAD. GUADELOUPE. BARBADOS. BRAZIL. TONGA. VANUATA. RHODESIA. SOUTH AFRICA. NIGERIA. CYPRUS. TENERIFE. GRAN CANARIA.

Hosts. *D. innoxius* is common in Oahu, Hawaii causing moderate damage to sweet potatoes, lettuce, and yams (Wilson, 1975). This species was also collected from the following: dry leaves, dry vines, grass, *Musa sapientum*, Convulvulaceae, *Ipomoea triloba*, *Bidens pilosa* , leaf galls on *Hewittia bicolor* , herb, leaves of *Ipomoea* sp., *Ipomoea staphylina*, *Ipomoea batatas*, *Echinochloa crusgalli*, *Dioscorea sp*., *Ipomoea congesta*, lettuce and wild plant.

***Dendrothripoides microchaetus* Okajima**
Dendrothripoides microchaetus Okajima, 1987a: 696-698.
Holotype female, Philippines: Agko, Mt. Apo (**Okajima**) [not examined]

Diagnosis. Body yellow with yellowish major body setae. Head reticulate anteriorly, transversely striate posteriorly behind collar. Antennal segment III with dorsal forked sense cone; segment IV with long, ventral forked sense cone. One pair of posteroangular setae developed, stout, nearly pointed at apex. Legs yellow. Forewings brownish grey; anterior vein with 2 to 3 distal setae. Metanotum reticulate medially. Abdominal tergites IX and X with B1 setae long and stout.

This species is known only from the type material and my interpretation follows that of Okajima (1987a).

Female macroptera. Head wider than long, brownish and reticulate anteriorly; transversely striate posteriorly behind collar. Preocellar setae developed; interocellar setae outside ocellar triangle. Postocular setae developed. Cheeks slightly expanded laterally; slightly incut behind eyes. Antennae about 3 times as long as head; segment III with dorsal, forked sense cone; segment IV with long, ventral, forked sense cone; apical half of segment IV and segments VI to VIII greyish brown; extreme base of segment VI and segment VIII paler. Mouthcone narrow, not extended to posterior margin of prosternum.

Pronotum slightly wider than long; surface nearly smooth; discal setae slender. One pair of posteroangular setae developed, stout, nearly pointed at apex. Legs yellowish. Forewings shaded with brownish grey basally, medially and apically; anterior vein with 5 to 6 basal setae, 2 to 3 distal setae; posterior vein with only 4 setae; scale greyish brown. Mesonotum coarsely reticulate. Metanotum reticulate medially, with longitudinal striae laterally.

Abdomen comparatively slender. Tergite I reticulate medially. Tergites II to VIII smooth or reticulate medially, distinctly reticulate laterally, reticules with fine microtrichia.

Tergite VII with 2 pairs, of long, slightly curved median setae. Tergite IX nearly smooth. Tergite X with distinct longitudinal striae. B1 setae on tergites IX and X long, stout.

Male. Unknown.

Material examined. Type specimens not examined.

Distribution (Fig. 30). The known range of this species extends from the Philippine to Indonesia Archipelagoes. In the Philippines, this species is known from the island of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo. INDONESIA: Sulawesi.

Hosts. bush with *Bambusa* sp., dead branches, grass

***Dendrothripoides nakaharai*, n. sp.**

Holotype female, Philippines: taken in quarantine at Los Angeles, California (USNM)
Figure 29 a, b, c, d, e, f

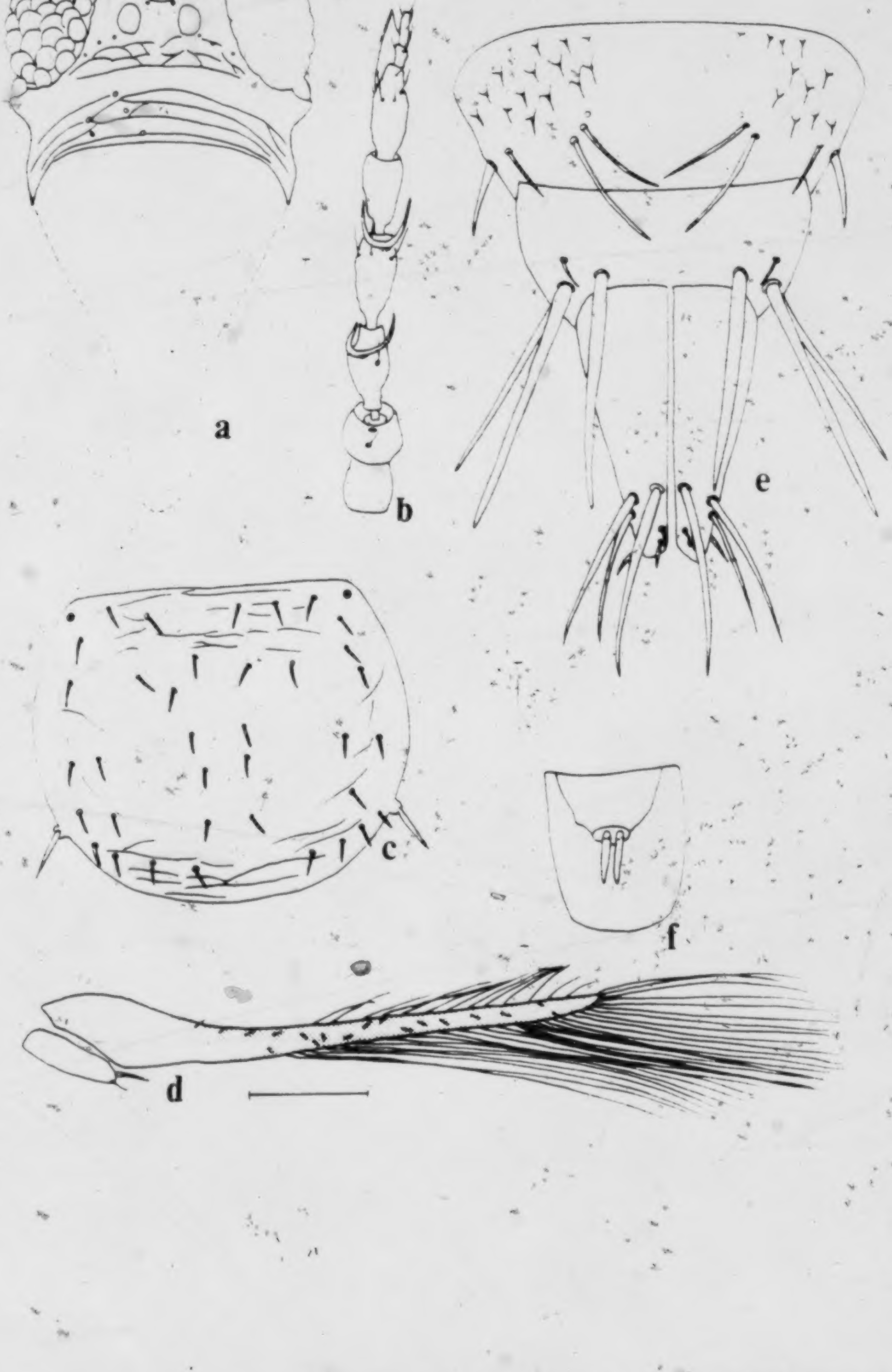
Diagnosis. Body bicolored. Head and thorax yellow with shade of brown on lateral margins; meso and metascuta and abdomen brown. Cheeks expanded laterally and incut behind eyes. Antennal segments III and IV each with a dorsal forked sense cone. Mouthcone reaching posterior margin of prosternum. Pronotal posteroangular setae about 1.5 times as long as discal setae. Legs yellow. Forewings brown, with basal quarter with white borders; apex light brown. Abdominal tergite VIII with 2 pairs of stout, median setae.

Members of this species resemble those of *D. innoxius* in having a long and narrow mouthcone, and antennal segments III and IV each with a dorsal, forked sense cone. *D. nakaharai*, n. sp. differs from the latter in having a bicolored yellow and brown body, posteroangular setae stout, and more than 1.5 times as long as discal setae, nearly pointed at apex and inserted on raised sockets, and forewings brown. This species is known only from the type material.

Female macroptera. Head yellow, reticulate anteriorly, transversely striate posteriorly behind collar (Fig. 29a). Interocellar setae inside ocellar triangle. Eyes protruded, large. Postocular setae short. Cheeks expanded laterally and slightly incut behind eyes. Antennae about 2 times as long as head; segments I to V yellow; segments III and IV each with a dorsal, forked sense cone; apical third of segment VI, and segments VII and VIII brown (Fig. 29b). Mouthcone long, extended to posterior margin of prosternum (Fig. 29a).

Pronotum yellow darker on lateral margins; rounded on posterior angles; discal setae developed; posteroangular setae stout, more than 1.5 times as long as discal setae, nearly pointed at apex and inserted on raised sockets (Fig. 29c). Legs yellow. Forewings shaded with brown, basal quarter with pale borders; apex light brown; apical setae long,

Fig. 29. *Dendrothripoides nakaharai*, n. sp., female holotype. a. Head b., Right antenna c. Pronotum d. Forewing e. Abdominal tergite VIII to X f. Male allotype, abdominal tergite IX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shaded; scale pale (Fig. 29d). Meso and metascuta shaded with brown. Mesonotum transversely reticulate. Metascutal median sculpture in form of a poorly inverted triangle.

Abdomen brown; tergite II dark brown. Tergites I to VIII smooth medially, with V-shaped cuticular thickenings laterally (Fig. 29e). Tergite VIII with 2 pairs of stout, median setae. B1 setae of tergite IX well developed, stout, dark and with pointed apices; B2 setae longer than B1. Tergite X completely divided longitudinally; apical setae strong but shorter than those on IX.

Dimensions (holotype female; um). Body length (extended) 1115.2. Head length 71.4, median width 125.8; dorsal eye length 47.6; antennal segments length: I 18.7; II 20.4; III 39.1; IV 39.1; V 34; VI 40.8; VII 8.5; VIII 11.9. Pronotum length 122.4; median width 158.1, posteroangular setae 22.1. Tergite IX setae: B1 90.1; B2 107.9.

Type data. **Holotype** female, PHILIPPINES: Manila, taken in quarantine at Los Angeles, California, U.S.A., on Labiata, 29-XII-1985, P. Whitby; **Paratypes** (1 female, 2 males) same data as in holotype (**USNM**).

Male macroptera. Similar to female in structure but smaller. Abdominal tergite IX with median pair of stout, spine-like setae borne on a single tubercle (Fig. 29f). Sternites without glandular areas.

Dimensions (allotype male; um). Body length (extended) 979.2. Head length 68, median width 115.6; dorsal eye length 44.2; antennal segments length: I 18.7; II 30.6; III 34; IV 37.1; V 32.3; VI 39.1; VII 6.8; VIII 11.9. Pronotum length 113.9, median width 127.5, posteroangular setae 22.1. Tergite IX setae: B1 35.7; B2 56.1.

Material examined. Type series only (**USNM**).

Etymology. This species is named after Sueo Nakahara for providing the specimen and for considerable assistance during my visit to USNM.

Distribution (Fig. 30). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Manila.

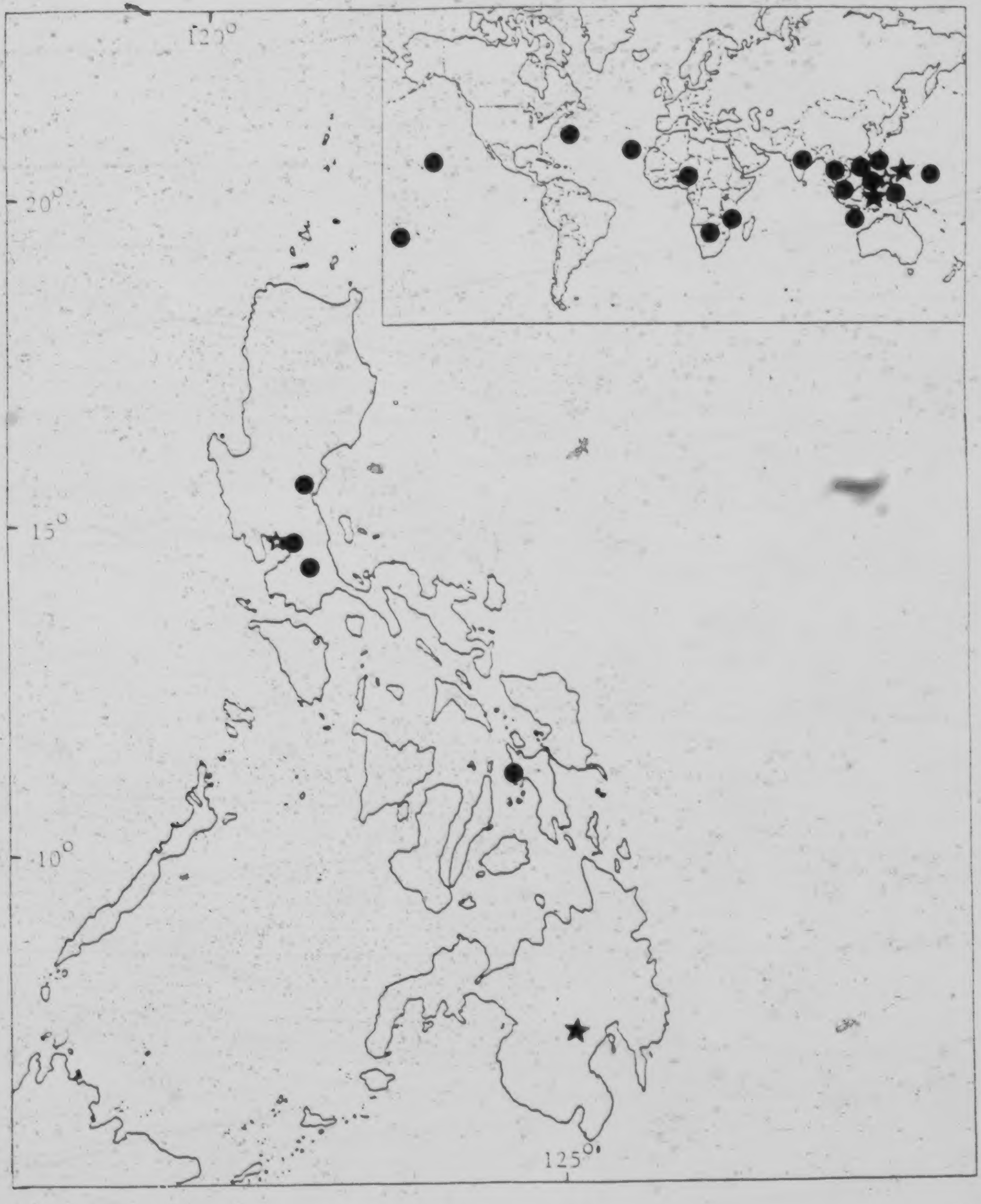
Host. on Labiata

Fig. 30. Distribution of *Dendrothripoides* species in the Philippines, and world.

● *D. innoxius* (Karny).

★ *D. microchaetus* Okajima

☆ *D. nakaharai*, n. sp.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Genus *Dendrothrips* Uzel

Dendrothrips Uzel, 1895: 159-160.
Type species: *Dendrothrips ornatus* (Jablonowski) a synonym of *Dendrothrips tiliae* Uzel,
by subsequent designation of Stannard, 1968.

Diagnosis. Head wider than long; vertex concave between eyes. Eyes large, 0.7 to 0.8 times as long as head. Ocelli positioned posteriorly; ocellar setae pair I absent; postocular setae absent. Antennae 7- to 9- segmented, short and stout, antennal segments III and IV each with simple or forked sense cone; segments III to V, with 4, 5 and 6 setae respectively. Maxillary palpi 2 -segmented. Mouthcone short to long.

Pronotum wider than long; transversely or polygonally reticulate, with dots or wrinkles in reticules and without prominent setae, with a pair of distinct posteroangular setae. Tarsi 1-segmented. Forewings with posterior margin straight, costal margin downturned; surface of wing with or without uniform covering of microtrichia; costal setae minute; apex of wing without long seta; anterior fringe cilia inserted on ventral side, far from costal margin; posterior fringe cilia straight. Metathoracic furca lyre-shaped. Meso and metasternal spinulae present.

Abdomen with sculpture, with many dots or wrinkles in reticules. Tergites I to VIII each with B1 setae elongate and closely spaced. Pleurotergites separated from tergites. Tergite VIII with comb of microtrichia on posterior margin. B1 setae on tergite IX longer than those on tergite X. Tergite X entire. Males without sternal glandular areas. Adults of this genus are distinctive in having a sculptured abdomen.

Dendrothrips includes about 40 species (zur Strassen, 1968; Bhatti, 1971c; Kudo, 1984). A new species, *Dendrothrips virgulatus*, is described below from the Philippines.

***Dendrothrips virgulatus*, n. sp.**
Holotype female, Philippines: Mt. Pangasugan, Leyte (**UPLB**)
Figure 31a, b, c, d, e

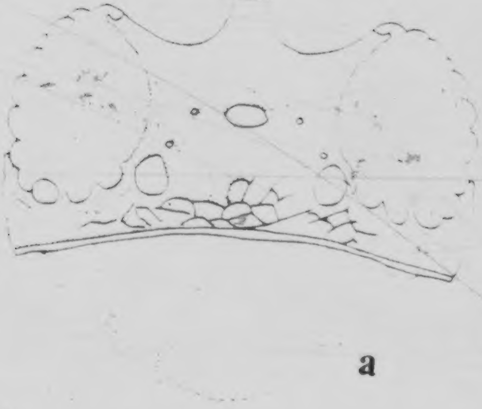
Diagnosis. Body bicolored. Head and thorax brown; abdomen yellowish brown laterally, yellow medially; sternites II to VII with red hypodermal pigment in longitudinal stripe on either side. Interocellar setae minute, placed outside ocellar triangle. Antennal segments III and IV each with simple sense cones. Legs brown. Forewings brown, with pale base; longer than body. Abdominal tergite I reticulate medially. Median setae on tergites well developed, closely positioned.

Members of this species resemble those of *D. sexmaculatus* Bagnall in not having prominent setae on posterior angles of the pronotum. *D. virgulatus*, n. sp. differ principally from the latter in having a simple sense cone on each of antennal segments III and IV, bicolored brown and yellow body, and in having red, lateral hypodermal pigment in a longitudinal stripe on either side of abdominal sternites II to VII. This species also resembles *D. minutus* Ananthakrishnan in having a simple sense cone on antennal segment III but differ from the latter in body color, forewing chaetotaxy and banding, and in shape and color of antennal segments. It is unfortunate that the available specimen of these interesting thrips are not in excellent condition.

Female macroptera. Head brown, wider than long; reticulate; reticules with dot-like thickenings. Interocellar setae minute, placed outside of ocellar triangle (Fig. 31a). Eyes large, more than one-half of head length. Cheeks smooth. Antennae generally brown, about 2 times as long as head; segment II dark brown; segments III and IV light brown, each with simple sense cone; segment V nearly parallel-sided, longer than segment VI (Fig. 31b). Mouthcone rounded (Fig. 31a).

Pronotum brown, wider than long; reticulate; reticules with dot-like thickenings; discal setae short, including posteroangulars (Fig. 31c). Legs brown; tarsi light brown. Forewings longer than body, pale at base; apical three quarters shaded with

Fig. 31. *Dendrothrips virgulatus*, n. sp., female holotype. a. Head b. Left antenna c. Pronotum d. Meso and metanotal sculpture e. Forewing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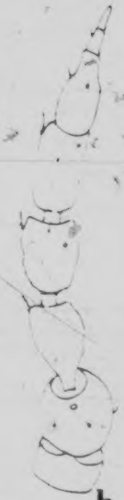
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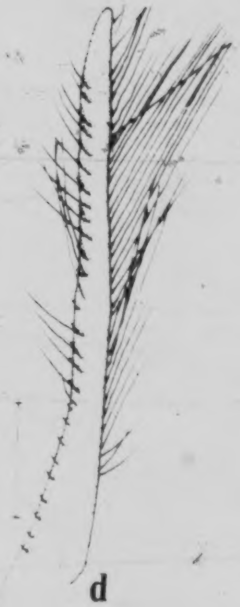
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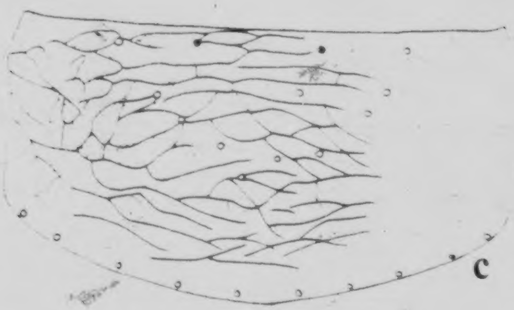
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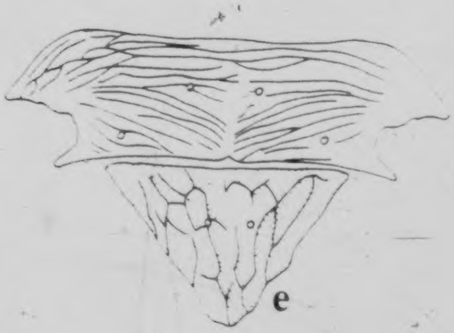

e

brown; microtrichia developed; anterior fringe cilia inserted ventrally anteriad margin; anterior vein setae minute (Fig. 31d). Mesonotum with closely spaced, transverse striae, striae anastomosed medially on posterior half (Fig. 31e). Metascutum longitudinally reticulate; reticules with dot-like thickenings; median setae small (Fig. 31e).

Abdomen yellowish brown laterally, yellow medially. Tergite I reticulate medially, nearly smooth laterally. Tergites II to VIII transversely reticulate laterally; reticules with dot-like thickenings; smooth medially; median setae long, close together. Sternites II to VII with red hypodermal pigment in longitudinal stripe on either side.

Dimensions (holotype female; um). Body length (extended) 588.2. Head length 71.4, median width 122.4; dorsal eye length 37.4; antennal segments length: I 11.9; II 25.5; III 27.2; IV 22.1; V 23.8; VI 18.7; VII 6.8; VIII 6.8. Pronotum length 66.3; median width 142.8.

Male. Unknown.

Type data. Holotype female, PHILIPPINES: Visayas: Mt. Pangasugan, Leyte, on unknown shrub, 21-II-1983, L. C. Raros (**UPLB**). **Paratype** (1 female) same data as holotype (**UPLB**).

Material examined. **Type** series only (**UPLB**).

Etymology. Virgulatus is a Latin word meaning "striped" in reference to the red hypodermal pigment in abdominal sternum of these thrips.

Distribution (Fig. 34). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Mt. Pangasugan, Leyte.

Host. unknown shrub.

Genus Dichromothrips Priesner

Dichromothrips Priesner, 1932a: 110.
Type species: *Dichromothrips orchidis* Priesner, by original designation and monotypy.

Diagnosis. Head with longitudinal row of tubercles present in front of median ocellus. Ocellar setae pair I absent; interocellar setae various in position and length. Antennae 8-segmented, with segments III-IV with apical neck, and elongate, each with forked sense cone; segment V relatively broad at apex. Maxillary palpi 3- segmented.

Pronotum transverse, without or with 1 or 2 pairs of long posteroangular setae. Macropterous or brachypterous. Forewings with about 12 basal, 1 median and 2 distal setae on anterior vein, 10-20 setae on posterior vein. Metanotum with median setae near anterior margin. Meso and metasternal spinulae present.

Abdominal tergites without lateral ctenidia. Tergite VIII with group of microtrichia anterolaterad spiracles; posterior margin of VIII with comb of long, fine microtrichia. Tergite X of female entire. Sternites without accessory setae; sternite VII with median and submedian setae arising in front of posterior margin. Tergite IX of male without stout dorsal setae, lateral and posteroangular setae stout; sternites III-VII each with paired oval or round glandular areas, these fused medially.

Members of *Dichromothrips* are mainly associated with plants of the family Orchidaceae. About 14 species are included in this genus (Mound,1976a). There are 4 species of *Dichromothrips* known in the Philippines (Sakimura, 1955).

Key to Philippine species of *Dichromothrips* Priesner

1. Pronotum with posteroangular setae as long as discal setae, pronotal striations fine but conspicuous .... *D. corbetti* (Priesner)

1' Pronotum with pair of long posteroangular setae; pronotal striations fine 2

2(1'). Forewings unbanded; mouthcone pointed; legs yellow; bicolored species .... *D. semicognitus* Sakimura

2' Forewings banded; mouthcone rounded; body brown 3

3 (2') Preocellar tubercles developed; pronotal striations fine; male sternal glandular area large, transversely oblong .... *D. phalaenopsidis* Sakimura

3' Preocellar tubercles absent; pronotum with fine, transverse sculpture; male sternal glandular area elliptical or oval .... *D. dendrobii* Sakimura

***Dichromothrips corbetti* (Priesner)**
Anaphothrips corbetti Priesner, 1936: 209.
Holotype female, Malaysia: Kuala Lumpur (**SMFG**)[examined]

Diagnosis. Body brownish. Head with preocellar tubercles weakly developed. Interocellar setae placed outside ocellar triangle. Antennal segments III and IV brown with pale apices. Pronotal posteroangular setae about as long as discal setae. Legs bicolored. Forewings brown, basal third pale; vein setae short. Abdominal tergite VIII with long, thick comb of microtrichia on posterior margin. Tergites IX and X with developed apical setae.

D. corbetti is the only species included in the genus with the least developed pronotal setae (Sakimura, 1955).

Female macroptera. Head with weakly developed preocellar tubercles; vertex depressed below foreocellus. Interocellar setae developed, outside ocellar triangle. Antennae about 2.5 times as long as head; predominantly brown; segments III and IV brown with pale apices. Mouthcone elongate, rounded.

Pronotum transversely striate; discal setae developed; posteroangular setae short, about as long as discal setae. Femora brown; tibiae brown on basal two-thirds, yellow on apical third; tarsi yellow. Forewings wide near base and at middle; brown, basal third pale; anterior vein setae short for genus, with 4 basal, 8 to 10 median, and 3 distal setae. Mesonotum transversely striate. Metascutum transversely reticulate medially, longitudinally striate laterally; median setae developed, behind anterior margin.

Abdominal tergites smooth medially, transversely striate laterally. Tergite VIII with long, thick comb of microtrichia on posterior margin. Tergite IX with B1 and B2 setae dark, longer than tergite X, pointed at apex. Sternites with conspicuous sculpture. Submedian setae of sternite VII placed slightly anterior of median setae.

Male brachyptera. Similar to female in color. Abdominal tergite IX with slender lateral setae. Sternites III to VII each with transversely oblong glandular area.

Material examined. 4 females, Philippines taken in quarantine at Honolulu on *Renanthera storiei*, 5-XII-1935, T. S. Uyeda (**TMNH**); 5 females, UPLB, Laguna, on flowers of *Vanda* sp., 5-VII- 1983, C. R. Baltazar; 1 female, Dingle, Iloilo, on *Vanda* sp., 23-V-1987, C. P. Reyes; 6 females, Dingle, Iloilo, on *Dendrobium* sp., 23-V-1987, C. P. Reyes; 5 females, Dingle, Iloilo,on flower of wild orchid, 23-V-1987, C. P. Reyes; 1 female, Jaro, Iloilo, on *Dendrobium* sp., 14-III-1985, C. P. Reyes; 2 females, Cebu City, on *Vanda* sp., 16-VI-1983, C. R. Baltazar; 2 females, Mandaue, Cebu, on flowers of *Vanda* sp., 9-VIII-1984, C. R. Baltazar (**CPRC**); 1 female, taken in quarantine, on *Renanthera storieri*, 1935; 1 female, Manila, taken in quarantine, on cut leaves, 1982, S. Ochikubo (**USNM**).

Distribution (Fig. 32). The known range of this species extends from India eastward in the Pacific Islands, to the Indonesian Archipelago. In the Philippine Archipelago, this species is known from the islands of Luzon and Visayas. PHILIPPINES: Luzon: Manila, taken in quarantine at Honolulu; UPLB, Laguna; Visayas: Dingle, Iloilo; Jaro, Iloilo; Cebu City; Mandaue, Cebu. MALAYSIA: Kuala Lumpur. SINGAPORE. THAILAND. INDONESIA: ?Java. INDIA. U.S.A.: Hawaiian Is.

Hosts. This species is common on different varieties of orchids in the Philippines. This species was collected from the following: *Renanthera storiei*, flowers of *Vanda* sp., *Dendrobium* sp., flower of wild orchid, cut leaves, *Vanda joaquim*, various *Vanda* hybrids, *Miltonia* sp., *Cattleya* sp., flower of orchid

***Dichromothrips dendrobii* Sakimura**
Dichromothrips dendrobii Sakimura,1955: 590-592.
Holotype female, U.S.A.: Hawaii: Manoa, Oahu (**BPBM**)[examined]

Diagnosis. Body greyish brown. Head depressed in front of foreocellus. Antennae slender, greyish brown. Forefemora greyish brown; mid and hindfemora pale; tibiae yellowish at inner apices; tarsi yellowish. Forewings with broad cross band at median third; wing apex brownish grey; anterior vein with 3 distal setae. Abdominal tergite VIII with long, dense comb of microtrichia on posterior margin. Sternites without accessory setae.

Female macroptera. Head slightly wider than long, depressed in front of foreocellus; transversely striate posteriorly; vertex produced at bases of antennae. Interocellar setae outside ocellar triangle. Postocular setae minute. Cheeks slightly constricted behind eyes. Antennae greyish brown, slender; segments III and IV slightly swollen ventrally, each with forked sense cone; segment III brown on basal two-thirds, pale on apical third; segment IV pale on basal third, brown on apical two-thirds. Mouthcone short, broadly rounded.

Pronotum covered with fine transverse striae; discal setae small; inner posteroangular setae longer than outer pair, about 2 times as long as discal setae. Forefemora greyish brown; mid and hindfemora pale; tibiae yellowish at inner apices; tarsi yellowish. Forewings with broad cross band at median third; wing apex brownish grey; anterior vein with 4 basal and 3 distal setae; posterior vein with 14 or 15 setae. Metascutum striate.

Abdominal tergites with sculpture not extended medially; lateral setae thin. Tergite VIII with long, dense comb of microtrichia on posterior margin. Sternites without accessory setae. Submedian setae on sternite VII slightly anteriad median setae.

Male macroptera. Similar to female in general structure. Abdominal tergite IX with slender lateral setae. Legs uniformly dusky yellow. Abdominal sternites III-VII each with pair of elliptical or oval glandular areas.

Material examined. 6 females, Manila taken in quarantine at Honolulu, Hawaii, on *Phalaenopsis grandiflora*, 3-III-1938, F. T. Kitamura; 2 females, Manila taken in quarantine at Honolulu, Hawaii, on *Phalaenopsis amabilis*, 11-IV-1938, F. T. Chong (**TMNH**); 53 females, 6 males, on *Phalaenopsis grandiflora*, 1938, E. C. Decker; 4 females, 3 males, on *P. grandiflora*, 1938, Buffham; 1 female, *P. grandiflora*, 1938, M. S. Coulson; 1 female, *P. grandiflora*, 1938, E. Kitamura; 1 female, on *P. aphrodite*, 1938, D. P. Limber; 1 female, 1 male, taken in quarantine at Honolulu, on *P. amabilis*, 1938, T. F. Chong; 1 female, taken in quarantine at Honolulu, on *P. sanderiana*, 1938, T. F. Chong; 2 males, taken in quarantine at Honolulu, on *P. lindeni*, T. F. Chong, 1938; 1 female, 1 male, Rizal, taken in quarantine at San Francisco, on *Dendrobium superbum*, 1939, B. Bryant (**USNM**).

Distribution (Fig. 32). The known range of this species extends from Hawaiian and Philippine Archipelagoes. In the Philippines, this species is known from the island of Luzon. PHILIPPINES: Luzon: Manila, taken in quarantine at Honolulu and San Francisco, California; Rizal. U. S. A.: Hawaiian Is.

Hosts. Adults and larvae of this species are injurious on young leaves and flower buds of *Dendrobium superbum* in Hawaii (Sakimura, 1955). This species was also collected from the following: *Phalaenopsis grandiflora*, *P. amabilis*, *P. aphrodite*, *P. sanderiana*, *P. schilleriana*, *P. lindeni*.

***Dichromothrips phalaenopsidis* Sakimura**
Dichromothrips phalaenopsidis Sakimura, 1955: 593-594.
Holotype female, Philippines taken in quarantine at Honolulu, Hawaii (**BPBM**)[examined]
Dichromothrips sakimurai Bhatti; Mound, 1976a: 245.

Diagnosis. Body dark brown. Head with longitudinal row of small tubercles between foreocellus and antennal bases. Interocellar setae developed laterad foreocellus inside ocellar triangle. Cheeks slightly constricted behind eyes. Antennae brown except segment III with pale base and apex. Pronotum striate. Femora greyish brown with pale bases and apices; tibiae yellow with grey bases; tarsi yellow. Forewings yellowish; wide near base and at middle, with broad, dark brown cross band; basal quarter pale; apex brown; anterior vein with 3 distal setae. Abdominal tergite VIII with complete comb of fine, long, dense microtrichia on posterior margin. Sternites without accessory setae.

Female macroptera. Head not depressed below foreocellus, with longitudinal row of small tubercles between foreocellus and antennal bases; transversely striate posteriorly. Preocellar setae nearly at level with foreocellus; interocellar setae developed, placed lateral of foreocellus, inside ocellar triangle. Postocular setae developed; inner pair longest. Cheeks slightly constricted behind eyes. Antennae slender; predominantly brown; segment III pale basally and apically; segments III and IV each with forked sense cone. Mouthcone elongate, rounded.

Pronotum striate; 2 pairs of posteromarginal setae mesad angulars, inner pair longest; posteroangular setae prominent. Femora greyish brown with pale apices and bases; tibiae yellow with grey bases; tarsi yellow. Forewings yellowish, wide near base and at middle; median dark cross band broad; basal quarter pale, apex brown; anterior vein with 4 basal, 6 median and 3 distal setae; posterior vein with 15 setae. Meso and metanotum with transverse striae medially. Metascutum striate; median setae near anterior margin.

Abdominal tergites and sternites with striae laterally; posteromedian area smooth; lateral setae developed. Posterior margin of tergite VIII with complete comb of fine, long, dense microtrichia. Tergites IX and X with developed, dark apical setae. Sternites without accessory setae.

Male brachyptera. Similar to female in structure. Posterior abdominal tergites darker. Tibiae and tarsi yellow. Sternites each with pair of large, transversely oblong glandular area; sternite III with smaller glandular area; surface densely dotted.

Material examined. **Holotype** female, Philippines taken in quarantine at Honolulu, Hawaii, on *Phalaenopsis stuartiana*, June 6,1939 (**BPBM**); 3 males, taken in quarantine, on *Phalaenopsis stuartiana*, 1939, T. F. Chong; 2 females, taken in quarantine, 1937, 1938, R. D. Clemens; 1 female, 2 males, taken in quarantine, on leaf sheath of *P. schilleriana*, T. F. Chong; 1 female, Manila, 1937; 1 female, on leaf of *P. grandiflora*, 1938, T. F. Chong; 1 male, taken in quarantine, on *P. amabilis*, 1939; 1 female, taken in quarantine, on *P. aphrodite*, T. F. Chong; 1 female, 1 male, taken at quarantine, 1938, T. F. Chong; 1 female, on *Renanthera* sp., 2 females, taken in quarantine at San Francisco, 1937, 1941, N.S. Coulson (**USNM**).

Distribution (Fig. 32). The known range of this species extends from Netherlands eastward in India, to Southeast Asia and South America. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: Manila; taken in quarantine at Honolulu and San Francisco. THAILAND. INDIA. SRI LANKA. JAPAN. NETHERLANDS. VENEZUELA. BRAZIL. GRENADA.

Hosts. *Phalaenopsis stuartiana*, *P. schilleriana*, *P. grandiflora*, *P. amabilis*, *P. aphrodite*, *Renanthera* sp., *Vanda* sp., orchid, orchid epiphytic on *Mangifera indica*, *Paphiopedilum sukhakulii*, *Aerides falcatum*, *Cymbidium* sp. in light trap, *Paphiopedilum* sp.

Dichromothrips semicognitus Sakimura
Dichromothrips semicognitus Sakimura, 1955: 595-596.
Holotype male, Philippines taken in quarantine at Honolulu,
Hawaii(**Sakimura**)[examined]

Diagnosis. Body bicolored. Head and thorax brown, abdominal tergites III to VII yellowish, remainder light brown. Antennal segments I and II brown; segments VI to VIII light brown; apex of segment III, basal quarter of IV and V yellow. Legs yellow. Forewings light brown, pale on basal third, wide near base and middle; anterior vein with 3 distal setae. Abdominal tergite VIII with complete comb of long microtrichia on posterior margin. Sternites III to VII each with pair of large, transversely oblong glandular areas.

The only known male of this species is similar to that of *D. smithi* (Zimmermann) (Mound, 1976a). *D. semicognitus* differs from the latter in having brown abdominal tergites VIII-IX, and uniformly shaded distal part of the forewing.

Male macroptera. Head slightly wider than long; striate posteriorly. Interocellar setae long, moderately stout, inside ocellar triangle. Postocular setae minute. Cheeks slightly arched. Antennae slender; segments I and II brown; VI to VIII light brown; III and IV each with a forked sense cone; apex of segment III, basal quarter of segment IV and segment V yellowish. Mouthcone rounded.

Pronotum broad, rounded on posterior angles; weakly striate; posteroangular setae with inner pair longer than outer pair. Legs uniformly yellow. Forewings light brown, wide near base and middle, basal third pale; apex uniformly shaded with brown; anterior vein with 4 basal, 5 to 6 median and 3 distal setae; posterior vein with 14 setae; scale brownish, apical quarter clear. Meso and metascuta weakly striate.

Abdominal tergites weakly striate. Tergite VIII with complete comb of long microtrichia on posterior margin. Tergite X with 5 pairs of pale, apical setae. Sternites III to VII each with pair of large, transversely oblong glandular areas; surface of glandular areas densely dotted.

Female macroptera. Similar to male in structure. Antennal segments III and IV light brown apically. Pronotum with closely spaced striae.

Material examined. **Holotype** male, PHILIPPINES taken in quarantine at Honolulu, Hawaii, on *Phalaenopsis stuartiana*, April 27,1932, T. S. Uyeda (**BPBM**); 1 female, Manila taken in quarantine at San Francisco, California, on orchid (**USNM**).

Distribution (Fig. 32). The known range of this species extends from the Philippine Archipelago to Papua New Guinea. In the Philippines, this species is known from the island of Luzon. PHILIPPINES: Luzon: Manila; taken in quarantine at Honolulu, Hawaii and San Francisco. PAPUA NEW GUINEA.

Hosts. *Phalaenopsis stuartiana*, orchid, *Hyalosoma grandiflorum*

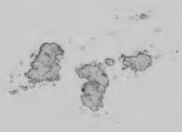


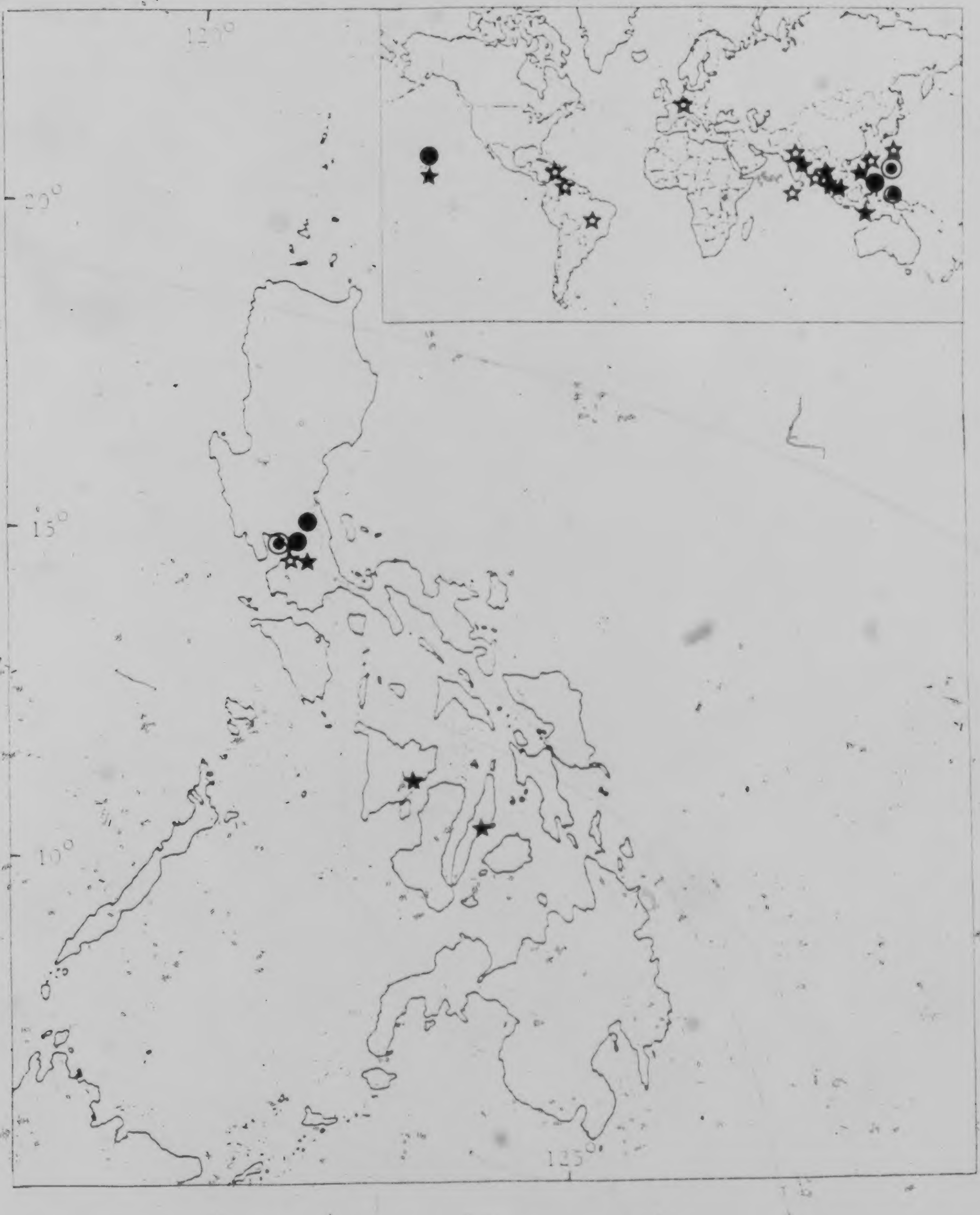
Fig. 32. Distribution of *Dichromothrips* species in the Philippines, and world.

★ *D. corbetti* (Priesner)

● *D. dendrobii* Sakimura

☆ *D. phalaenopsidis* Sakimura

⊙ *D. semicognitus* Sakimura


120°
20°
15°
10°
125°

Genus *Dorcadothrips* Priesner

Dorcadothrips Priesner, 1932b: 49.
Type species: *Dorcadothrips caespitis* Priesner, by original designation and monotypy.

Diagnosis. Head wider than long. Ocellar setae pair I absent. Eyes relatively large, protruded. Cheeks slightly or strongly constricted behind eyes. Antennae 8- segmented; segments III and IV each with forked sense cone ,these from U- to Y-shaped. Maxillary palpi 2- or 3 -segmented. Mouthcone broadly rounded.

Pronotum transverse; posteromarginal setae well developed. Forelegs slender; tarsi 2 -segmented. Macropterous, brachypterous or apterous. Forewings, when fully developed, narrow; setae on anterior vein broadly interrupted; setae on posterior vein uniformly spaced; posterior fringe cilia wavy. Mesosternal spinula present. Metasternal spinula absent.

Abdominal tergites with median pair of setae placed far apart. S4 setae on tergite VI and VII not reduced. Posteromarginal setae on sternite VII of female inserted along posterior margin. Tergite VIII without comb of microtrichia on posterior margin. Tergite IX lacking campaniform sensilla. Tergite X of female entire. Male with abdominal sternites III-VII each with median transverse and usually 2 semicircular, glandular areas; tergite IX with pair of horn-like processes (drepanae). Sternites with accessory setae.

Adults of *Dorcadothrips* species are very similar to those of *Trichromothrips* spp. in general appearance. The shape and number of glandular areas on male sternites as well as presence or absence of drepanae on tergite IX of males vary in members of both genera. Bhatti (1978a) reported that adults of the species *D. albus* Bhatti and *T. priesneri* (Bhatti) possess characters intermediate between those of species in these 2 genera. A new species from the Philippines *T. bruncurrum* which, for now, is provisionally placed under *Trichromothrips*, possesses similar intermediate characters. When more material has been collected and studied, it may well be that *Dorcadothrips* will be synonymized with *Trichromothrips*.

Presently, *Dorcadothrips* includes about 15 species mainly from the tropics (Bhatti, 1978a). One species, *D. pulchellus* is known from the Philippines.

***Dorcadothrips pulchellus* (Moulton)**
Taeniothrips pulchella Moulton, 1936: 268-269.
Holotype female, Philippines: Victorias, Negros Occidental (CASC)[examined]

Diagnosis. Body yellow with orange pigmentation on meso and metanota and lateral margins shaded with brown. Antennal segments I and II brown; II pale in basal two-thirds, brown on apical third; IV and V pale on basal half, brown in apical half; VI to VIII brown. Legs yellow. Forewings with median and subapical brown cross bands; anterior vein with 2 distal setae. Abdominal tergites III to VII with 2 longitudinal brown stripes.

D. pulchellus is known only from the laterally mounted female holotype whose characters are difficult to see. Bhatti (1978a) transferred this species to *Dorcadothrips*.

Female macroptera. Head wider than long. Interocellar setae developed. Antennal segments I and II brown; III pale in basal two-thirds, shaded with brown in apical third; IV and V pale in basal half, brown in apical half; VI to VIII brown; III about as long long as IV and each constricted towards apex and with forked sense cone. Mouthcone rounded.

Pronotum with inner pair of posteroangular setae longer than outer pair. Legs yellow. Forewings with median and subapical brown cross bands, base brown, apex pale; anterior vein with 6 basal, 2 distal setae; posterior vein with 13 setae.
Abdominal tergites III to VII with transverse brown shade and 2 longitudinal brown stripes. Tergites IX and X with developed apical setae.

Male. Unknown.

Material examined. Holotype female, PHILIPPINES: Victorias, Negros Occidental, on *Gossypium brasiliense*, 16-VII-1928, W. D. Pierce (Moulton Coll.) (CASC).

Distribution (Fig. 34). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Victorias, Negros Occidental.

Host. *Gossypium brasiliense*

Genus *Exothrips* Priesner

Exothrips Priesner, 1939b: 162.
Type species: *Exothrips monstrosus* Priesner, by original designation and monotypy.

Diagnosis. Head relatively small. Preocellar setae from 2 to 4 pairs. Antennae 8-segmented; segments III and IV each with forked sense cone ; segment I without dorsal setae near distal margin and enlarged in males of some species; segments III to VI with microtrichia; segments IV or V in males of some species curved and concave mesally. Maxillary palpi 3-segmented. Mouthcone broad.

Pronotum about as long as broad or longer; smaller than head; posteromarginal setae 6 - 7 pairs, posteroangular setae are longer. Tarsi 2-segmented. Posterior vein of forewings with only 4 setae, rarely 3 or 5; posterior fringe cilia wavy. Meso and metasternal spinulae absent. Mesanepimeron fully covered with dense pubescence of short microtrichia. Metanotum with anastomosed striae medially in form of reticules in some species.

Abdominal tergites and sternites with distinct posteromarginal flanges. Tergum X completely divided in both sexes. Sternite VII of female with S1 and S2 setae close together. Tergites IV to VII of male in some species expanded into laterally directed teeth. Projections of pleurites in form of short serrations apically. Male sternal glandular areas present. Phallus with 2 lobe-like processes, each with a sharp spike.

This grass feeding genus includes 16 species (Bhatti, 1975) and is represented only by *E. sacchari* Moulton in the Philippines.

Exothrips sacchari (Moulton)
Anaphothrips sacchari Moulton, 1936: 265.
Holotype female, Philippines: Victorias, Negros Occidental (**CASC**)[examined]

Diagnosis. Body yellow with apex of abdomen dark. Head wider than long. Interocellar setae short and placed within ocellar triangle. Antennal segment I pale; II brownish; III and IV pale yellow; basal half of V pale yellow, apical half brownish; VI to VIII brown; base of segment VI pale. Legs yellow. Forewings greyish brown; anterior vein with 3 distal setae. Abdominal tergite II with 4 lateral marginal setae.

This species infests sugarcane plants (Capco, 1957) and is known only in Negros Occidental. Bhatti (1975) transferred this species to *Exothrips* .

Female macroptera. Head striate posteriorly. Preocellar setae 2 pairs. Interocellar setae short within ocellar triangle at level with foremargins of posterior ocelli. Postocular setae I developed, shorter than II. Antennal segment I pale; II brownish; III and IV pale yellow; basal half of segment V pale yellow, apical half brownish; VI to VIII brown, base of VI pale; segments III and IV about as long as V each with forked a sense cone; segment VIII elongate, about 1.8 times as long as VII. Mouthcone rounded.

Pronotum broad, elongate, widest in median third; posterior angles rounded; posteromarginal setae 7 pairs; posteroangular setae not conspicuous. Legs yellow. Forewings greyish; vein setae dark; posterior vein with 4 to 5 setae; scale with 5 veinal and 1 discal setae. Median pair of mesonotal setae slender; lateral setae stout, dark. Metascutum with very stout median setae, far behind anterior margin; campaniform sensilla present.

Abdominal tergite II with 4 lateral marginal setae. Setae S4 of tergites VI to VIII reduced. Sternite VII with median setae slightly shorter than submedian pairs.

Male. Unknown.

Material examined. **Holotype** female, PHILIPPINES, Victorias, Negros Occidental, on flowers of sugarcane (*Saccharum officinarum*), 22-XI-1927, W. D.Pierce (Moulton

Coll.); **Paratype** (1 female) same data as holotype; 1 female, Victorias, Negros Occidental, on leaf of *Carica papaya*, 22-XI-1927, W. D. Pierce (CASC).

Distribution (Fig. 34). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Victorias, Negros Occidental.

Hosts. flowers of *Saccharum officinarum*, leaf of *Carica papaya*

Genus *Filipinothrips* n. gen.

Type species: *Filipinothrips baltazarae* n.sp.

Diagnosis. Head with transverse anastomosed striae posteriorly. Ocellar setae pair I present; interocellar setae well developed. Eyes large, more than one-third of head length; postocular setae short. Antennae 8- segmented, bases widely separated; segments III and IV each with long, dorsally inserted, forked sense cone; segment IV long, vasiform, apical third tube-shaped. Maxillary palpi 3-segmented. Mouthcone elongate, rounded.

Pronotal major setae well developed; anteromarginal setae much longer than anteroangulars; posteromarginal setae 4 pairs. Legs yellowish brown. Forewings shaded with brown; anterior vein with 2 distal setae; posterior vein with complete set of setae. Meso and metasternal spinulae present.

Abdominal tergites without lateral ctenidia. Posterior margin of tergite VIII without comb of microtrichia. Tergite IX with long, shaded apical setae. Tergite X entire. Males unknown.

Females of *Filipinothrips* n. gen. can be easily distinguished from other Thripinae by the following characters: antennal bases widely separated; apical third of antennal segment IV tubular and with a long forked sense cone. Adults of the genus resemble those of *Dichromothrips* Priesner and *Ranjana* Bhatti in having meso and metasternal spinulae.

***Filipinothrips baltazarae*, n. sp.**
Holotype female, Philippines: Luzon: Makiling Botanic Garden, College, Laguna (**UPLB**)
Figure 33a, b, c, d

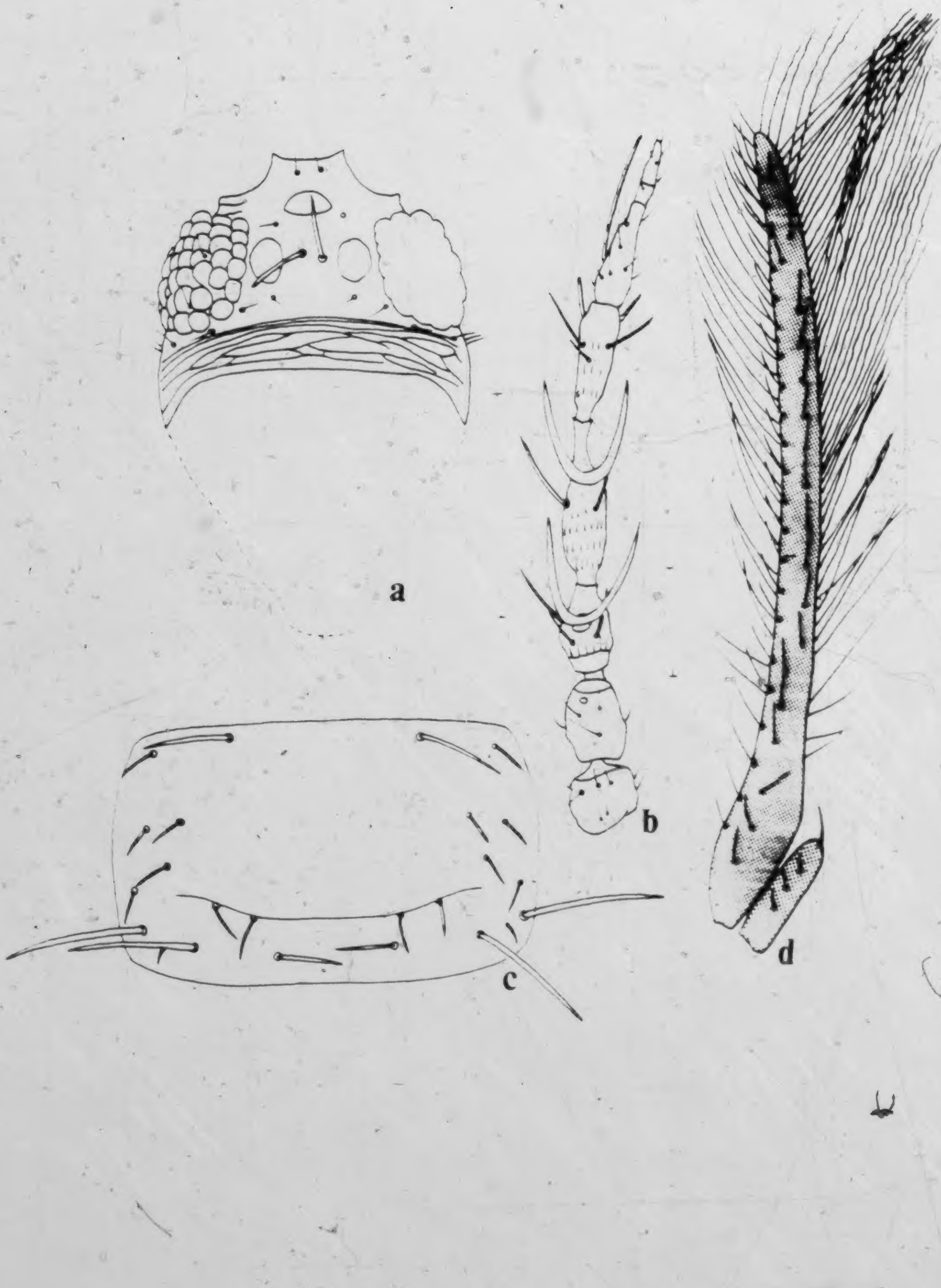
Diagnosis. Body brown. Head with transverse anastomosed striae posteriorly. Interocellar setae longer than postoculars. Antennae brown, segments III and IV each with long, forked sense cone; IV longer than III and with apical third strongly tubular. Pronotal anteromarginal setae long, about 2 times as long as anteroangulars. Legs yellowish brown with darker apices. Forewings brown; anterior vein with 2 distal setae. Metascutum weakly reticulate medially; longitudinally striate laterally. Abdominal tergite VIII with sparse microtrichia anteriad each spiracle. Tergite X entire.

In addition to the generic characters cited above, adults of this species are recognized by having elongate, proximal segments to the antennae, long anteromarginal setae, and abdominal tergite VIII with sparse microtrichia anterior to each spiracle. This species is unique in many ways but principally in having widely separated antennal bases.

Female macroptera. Head with transversely anastomosed striae posteriorly (Fig. 33a). Interocellar setae developed, inside ocellar triangle. Eyes more than one-third as long as head. Postocular setae shorter than interocellars. Antennae brownish, about 3 times as long as head; segments III and IV each with a long, forked sense cone; segment IV longer than segment III and with apical third strongly tubular; segment VI with very long simple sense cone on inner margin (Fig. 33b). Mouthcone rounded (Fig. 33a).

Pronotal major setae developed; anteromarginal setae about 2.0 times as long as anteroangulars; posteromarginal setae including angulars 4 pairs; inner pair of posteroangular setae about as long as outer pair (Fig. 33c). Legs light brown with darker apices. Forewings brown; anterior vein with 5 basal and 2 distal setae; posterior vein with complete row of setae (Fig. 33d). Metascutum reticulate medially, longitudinal striate laterally; median setae behind anterior margin.

Fig. 33. *Filipinothrips baltazarae*, n. sp., female holotype. a. Head b. Right antenna c. Pronotum d. Forewing


a
b
c
d

Abdominal tergites smooth medially, striate laterally. Tergite VIII with sparse microtrichia anteriad each spiracle; posterior margin without comb of microtrichia. B1 setae on tergite IX about as long as B2. Tergite X entire; B1 [illegible]e shorter and paler than those on IX. Sternites without accessory setae.

Dimensions (holotype female; um). Body length (extended) 1332.8. Head length 98.6, median width 139.4; interocellar setae length 28.9; dorsal eye length 54.4; postocular setae length 6.8; antennal segments length: I 32.3; II 33.2; III 51; IV 73.1; V 68; VI 54.4; VII 17; VIII 13.6. Pronotum length 105.4, median width 193.8, major setae length: aa 22.1, am 45.9, paI 61.2; pa II 71.4.

Male. Unknown.

Type data. **Holotype** female, PHILIPPINES: Luzon: Makiling Botanic Garden, UPLB, College, Laguna, on unknown plant, 4-VIII-1987, C.P.Reyes (**UPLB**).

Paratypes (6 females) same data as holotype (**UPLB**).

Material examined. Type series only (**UPLB**); 1 female, Bato Creek, Mt. Pangasugan, Leyte, unknown plant, 23-V-1984, L.C.Raros (**VISCA**).

Etymology. This species is named after a hymenopteran systematist, Dr. Clare R. Baltazar, who encouraged me to work on thrips.

Distribution (Fig. 34). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Luzon and Visayas. PHILIPPINES: Luzon: Makiling Botanical Garden, UPLB, College, Laguna; Visayas: Bato Creek, Mt. Pangasugan, Leyte.

Host. unknown plant

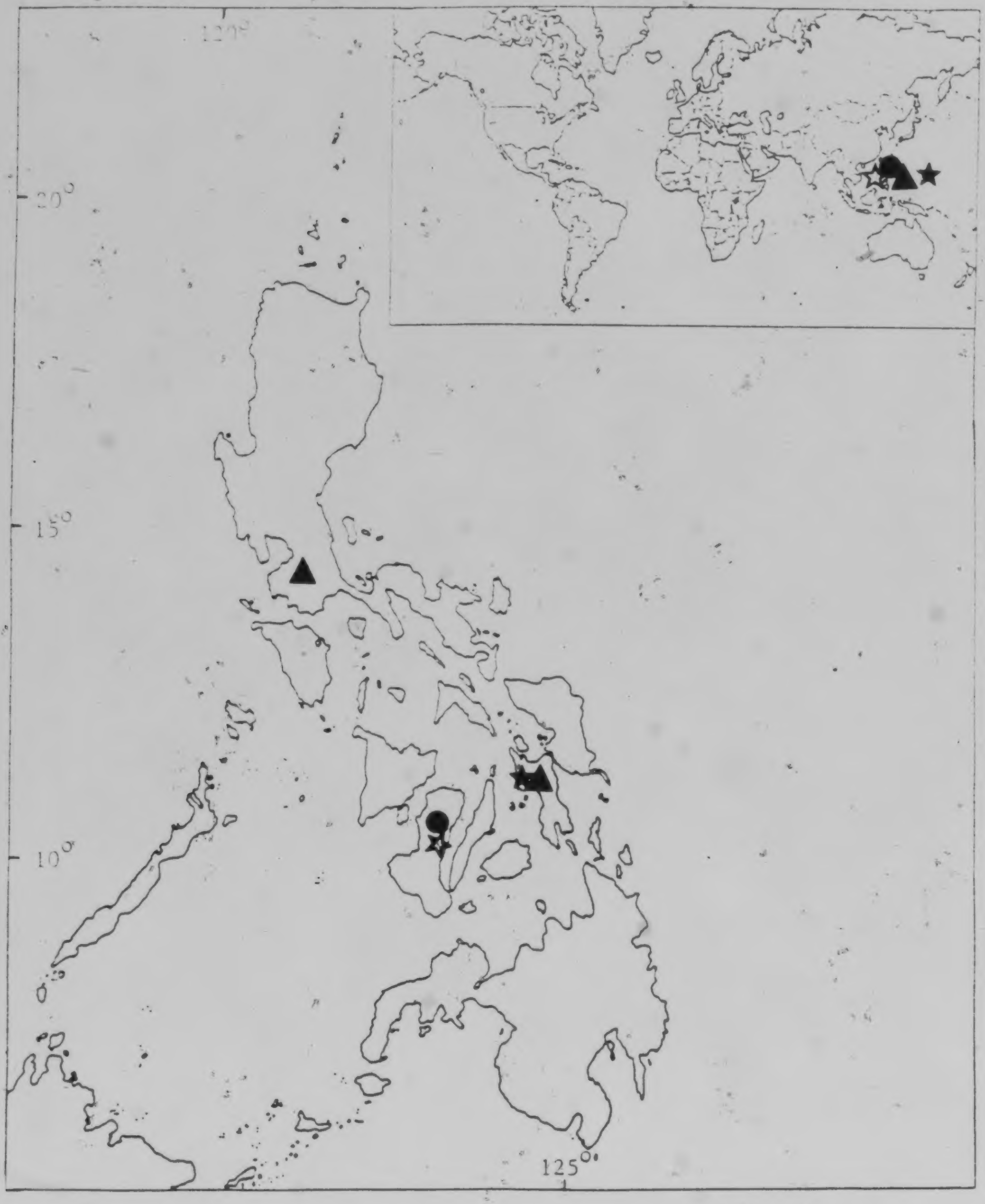
Fig. 34. Distribution of *Dendrothrips virgulatus*, n. sp., *Dorcadothrips pulchellus* (Moulton), *Exothrips sacchari* Moulton and *Filipinothrips baltazarae*, n. sp.

★ *Dendrothrips virgulatus*, n. sp.

● *Dorcadothrips pulchellus* (Moulton)

☆ *Exothrips sacchari* Moulton

▲ *Filipinothrips baltazarae*, n. sp.


120°
20°
15°
10°
125°

Genus *Frankliniella* Karny
Frankliniella Karny, 1910: 46.
Type species: *Thrips intonsa* Trybom, by subsequent designation of Hood, 1914.

Diagnosis. Head wider than long or longer. Ocellar setae pair I present. Interocellar and postocular setae usually well developed. Antennae 8- segmented; segments III and IV each with a forked sense cone. Maxillary palpi 3- segmented. Mouthcone moderate in size, pointed to rounded at tip.

Pronotum with developed major setae on both anterior and posterior angles; posterior margin with an additional pair of of small setae medially. Tarsi 2- segmented. Macropterous or brachypterous. Forewings when fully developed, with 2 veins, both completely set with setae; posterior fringe cilia wavy. Mesosternal spinula present. Metasternal spinula absent.

Abdominal tergites with median pair of setae far apart on intermediate tergites. Lateral ctenidia on abdominal tergites V-VIII, on VIII placed anteriad spiracles. Tergite VIII with or without complete comb of microtrichia on posterior margin. B2 setae on tergites V-VII reduced. Tergite X divided longitudinally. Sternites without accessory setae. Males with glandular area on each of sternites III-VII; tergite IX with short setae, thorn-like or not.

Frankliniella is a large genus including about 150 species, and worldwide in distribution (Mound and Walker, 1982). Most species occur in the Neotropics with a few from the Oriental region. Members of some species are of economic importance.

Key to Philippine species of *Frankliniella* Karny

1. Forewings yellowish brown; antennae predominantly brown; abdominal tergite VIII without comb of microtrichia on posterior margin ..... *F. schultzei* Trybom

1' Forewings clear yellow; antennae bicolored; abdominal tergite VIII with comb of microtrichia on posterior margin 2

2 (1') Comb on tergite VIII sparse; hindtibiae with series of six, strong, brown setae on inner margin .... *F. intonsa* Trybom

2' Comb on tergite VIII complete; hindtibiae simple; major setae clear yellow .... *F. williamsi* Hood

Frankliniella intonsa (Trybom)

Thrips intonsa Trybom, 1895: 182,188.
Type unknown, Sweden: Gotland [?Lost] [not examined]

Diagnosis. Body yellowish brown. Head widest at base. Antennal segments I and II brown; III to V yellowish; apices of segments IV and V brownish; VI to VIII brown. Pronotal anteroangular setae slightly longer than anteromarginals. Legs predominantly yellow. Forewings clear yellow. Metascutum transversely reticulate medially. Abdominal tergite VIII with sparse comb of microtrichia on posterior margin. Sternites without accessory setae.

Moulton (1948) reviewed the genus *Frankliniella* and provided keys for the determination of all species known at that time including *F. intonsa*.

Female macroptera. Head wider than long, widest at base; faintly striate posteriorly. Interocellar setae developed, placed within ocellar triangle. Postocular setae pair no. IV most developed; pair nos. I to III small. Antennal segments I and II brown, II darker; III to V yellowish; apices of segments IV and segment V brownish; VI to VIII brown; segments III and IV each with forked sense cone. Mouthcone narrowly rounded.

Pronotum nearly smooth, major setae developed; anteroangular setae slightly longer than anteromarginals; posteroangular setae with inner pair longer than outer pair. Legs predominantly yellow; femora, mid and hindtibiae darkened medially; hindtibiae with row of spine-like setae on inner margin. Forewings clear yellow; vein setae, strong, dark; posterior fringe cilia wavy; scale yellow. Mesonotum with faint, widely spaced transverse striae. Metascutum transversely reticulate medially; longitudinally striate laterally; median setae long, placed near anterior margin.

Abdominal tergites with weak lateral striae, smooth medially; median setae developed, placed far apart. Tergite VIII with sparse comb of microtrichia on posterior margin. Tergites IX and X with long, dark apical setae, pointed at apex. Sternites without accessory setae. Sternite VII with inner pair of posteromarginal setae placed anterior of posterior margin.

Male macroptera. Similar to female in structure. Head yellow; thorax orange yellow; abdomen grey; antennal segments I to V yellow; apices of segments IV and V, and segments VI to VIII brown. Abdominal tergite IX with B1 setae pale, moderately stout, pointed at apex; lateral setae dark, stout, pointed at apex. Abdominal sternites III-VII each with a transverse glandular area.

Material examined. 13 females, 1 male, MSAC, La Trinidad, Mt. Province, on flowers of strawberry, 14-III-1985, R. Reyes (**CPRC**).

Distribution (Fig. 35). The known range of this species extends from Europe eastward in India, to Southeast Asia. In the Philippine Archipelago, this species is know from the island of Luzon. PHILIPPINES: Luzon: MSAC, La Trinidad, Mt. Province. KOREA. INDIA. TAIWAN. HONGKONG. JAPAN. BANGLADESH. PAKISTAN. CHINA. MONGOLIA. GREECE. YUGOSLAVIA. LATVIA. TURKEY. GEORGIAN SSR. LITHUANIA. SWITZERLAND. AUSTRIA. POLAND. FRANCE. DENMARK. SERBIA. GREENLAND. ESTONIA. SIBERIA. NETHERLANDS. ALBANIA. DALMATIA. RUMANIA. RUSSIA. HUNGARY. U.K.: England; SCOTLAND. SWEDEN. CZECHOSLOVAKIA. GERMANY. FINLAND. ITALY.

Hosts. flowers of strawberry, on numerous flowering plants

Frankliniella schultzei **(Trybom)**
Physopus schultzei Trybom, 1910:151.
Type unknown, Luderitzbucht, S. W. Africa [**Unknown**] [not examined]
Frankliniella insularis Franklin; Moulton, 1936: 269.

Diagnosis. Body yellowish brown, with dark to orange yellow, or orange brown thorax. Head widest behind eyes. Antennae predominantly brown; segment II darker. Pronotal anteroangular setae much longer than anteromarginals. Legs bicolored. Forewings yellowish brown. Metascutum transversely reticulate anteriorly, longitudinally reticulate posteriorly. Abdominal tergite VIII without comb of microtrichia on posterior margin Sternites without accessory setae.

Female macroptera. Head wider than long, widest behind eyes, with few transverse striae posteriorly. Interocellar setae developed, inside ocellar triangle. Postocular setae pair IV developed; pairs I to III small. Antennae predominantly brown, segment II darker; segments III and IV light brown at base, each with forked sense cone. Mouthcone rounded.

Pronotum nearly smooth or with faint transverse striae; major setae developed; anteroangular setae much longer than anteromarginals; posteroangular setae with outer pair slightly longer than inner pair. Femora and tibiae brownish; apices of both pale; tarsi yellowish brown; hindtibiae with row of spine-like setae on inner margin. Forewings shaded with yellowish brown;subbasal area faintly shaded; anterior vein setae strong, shaded; posterior fringe cilia wavy; scale light brown. Mesonotum striate. Metascutum transversely reticulate anteriorly; longitudinally reticulate posteriorly; median setae long, at or near anterior margin.

Abdominal tergites striate laterally, smooth medially; median setae moderately long, placed wide apart. Tergite VIII without comb of microtrichia on posterior margin. Tergites IX and X with long, dark apical setae, pointed at apex. Sternites without accessory setae. Sternite VII with posteromarginal setae placed on margin.

Male macroptera. Similar to female in structure. Color of thorax and antennae lighter. Abdominal tergite IX with B1 setae short, moderately stout. Abdominal sternites III-VII each with transverse glandular area.

Material examined. 1 female, Saravia, Negros Occidental, on flowers of *Stachytarpheta jamaicensis*, 7-VI-1927, W. D. Pierce (Moulton Coll.) (**CASC**); 4 females, Hiwacloy, Goa , Camarines Sur, on "takip-kuhol", 3-VI-1987 and 1 female, on flowers of yellow bell, C. P. Reyes; 1 female, Bicol Expt. Sta., Pili, Camarines Sur, on *Macaranga* sp., 5-VI-1987, C. P. Reyes; 1 female, on *Mimosa pudica*, 5-VI-1987, C. P. Reyes; 4 females, Batac, Ilocos Norte, on flowers of *Ipomoea triloba*, 9-IV-1985, C. P. Reyes; 1 female, MMSU, Batac, Ilocos Norte, on leaf of *Nicotiana tabacum*, 9-III-1985, C. P. Reyes; 3 females, on unidentified weed, 12-II-1988, E. C. Mituda; 2 females, Sta. Barbara, Pangasinan, on *Gossypium* sp., 17-III-1988, E. C. Mituda; 4 females, Villasis, Pangasinan, on *Nicotiana tabacum*, 3-17-88, E. C. Mituda; 3 females, 2 males, IRRI, Los Banos, Laguna, on *Jasminum sambac*, 8-VIII-1982, C. P. Reyes; 2 females, Brooks Point, Palawan, on flower of *Tagetes erecta*, 30-I-1985, C. P. Reyes; 1 female, 1 male, VISCA campus, Baybay, Leyte, on *Vernonia cinerea*, 20-VI-1984, C. P. Reyes; 2 females, on tassel of *Zea mays*, 12-V-1984, C. P. Reyes; 1 female, Cebu City, on flower of *Dendrobium* sp., 16-VI-1983, C. R. Baltazar; 1 female, Mlang, North Cotabato, on *Mimosa pudica*, 23-IV-1983, C. P. Reyes (**CPRC**); 1 female, Vigan, Ilocos Sur, on *Gossypium* sp., H. Schmutterer (**SMFG**).

Distribution (Fig. 35). This species is a tropical "tramp" (Mound and Houston, 1982). In the Philippine Archipelago, this species is known from the three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: IRRI, Los Banos, Laguna; Batac, Ilocos Norte; MMSU, Batac, Ilocos Norte; Vigan, Ilocos Sur; Sta. Barbara, Pangasinan; Villasis, Pangasinan; Goa, Camarines Sur; Bicol Expt. Sta., Pili, Camarines Sur; Hiwacloy, Goa, Camarines Sur; Palawan: Brooks Point; Visayas: Saravia, Negros Occidental; VISCA campus, Baybay, Leyte; Cebu City; Mindanao: Mlang, North Cotabato. MALAYSIA. THAILAND. PAKISTAN. SRI LANKA. BANGLADESH. INDIA. AUSTRALIA. BRAZIL. COLOMBIA. ARGENTINA. JAMAICA. PAPUA NEW GUINEA. U.S.A.: Hawaii. JOHNSTON IS. CANARY IS. MARIANAS IS. ITALY. U.K.: England. SWEDEN. PALESTINE. CONGO. GAMBIA. SENEGAL. MOROCCO. SOMALIA. GHANA. EGYPT. RHODESIA. SUDAN. SOUTHWEST AFRICA. EAST AFRICA. UGANDA. KENYA. CAPE VERDE.

Hosts. *F. schultzei* is also known as a vector of virus diseases of tobacco and tomato in South Africa (zur Strassen, 1958). This species was also collected from the following: *Gossypium* sp., flower of *Stachytarpheta jamaicensis*, "takip-kuhol", *Macaranga* sp., flower of yellow bell, *Mimosa pudica*, flower of *Ipomoea triloba*, *Nicotiana tabacum*, flower of *Tagetes erecta*,*Vernonia cinerea*, tassel of *Zea mays*, flower of *Dendrobium* sp., *Gossypium* sp. and on many flowering plants.

Frankliniella williamsi Hood
Frankliniella williamsi Hood, 1915a: 19.
Holotype female, U.S. A.: Washington D.C. (USNM)[examined]
Frankliniella williamsi Hood; Moulton, 1948: 64.

Diagnosis. Body yellow. Head widest at base. Antennal segments I to V yellowish; apices of segments IV to V brown; VI to VIII dark brown, basal quarter of VI pale. Pronotal anteroangular setae longer than anteromarginals. Legs and forewings yellow. Metascutum faintly reticulate medially. Abdominal tergite VIII with developed comb of microtrichia on posterior margin. Sternites VI and VII with accessory setae.

Female macroptera. Head wider than long, widest at base, with few transverse striae posteriorly. Interocellar setae well developed, inside ocellar triangle. Postocular setae pair no. IV developed; pair nos. I to III small. Antennal segments I to V yellowish; apices of segments IV to V shaded with brown; VI to VIII dark brown; basal quarter of VI pale; III and IV each with forked sense cone. Mouthcone narrowly rounded.

Pronotum nearly smooth or with faint transverse striae; anteroangular setae longer than anteromarginals; posteroangular setae with inner pair longer than outer pair. Legs yellow. Forewings clear yellow; vein setae strong, dark; posterior fringe cilia wavy; scale yellow. Mesonotum transversely striate; striae anastomosed medially on posterior quarter. Metascutum reticulate medially; longitudinally striate laterally; median setae well developed, placed near anterior margin.

Abdominal tergites weakly striate laterally; smooth medially; median pair of setae moderately long, placed far apart. Tergite VIII with well developed comb of microtrichia on posterior margin. Tergites IX and X with long, dark apical setae. Sternites VI and VII with accessory setae. Sternite VII with inner pair of posteromarginal setae anteriad posterior margin.

Male macroptera. Similar to female in structure and color. B1 setae on tergite IX moderately stout, pointed at apex. Abdominal tergites IX and X with pale, well developed lateral setae, pointed at apex. Abdominal sternites III-VII each with a transverse glandular area.

Material examined. 1 female, UPLB, Los Banos, Laguna, on *Anacardium occidentale*, V-1987, C. P. Reyes; 5 females, 1 male, Pansol, Calamba, Laguna, on *Zea mays*, 22-VII-1987, V. J. Calilung; 2 females, Gabok, Canlaon, Negros Occidental, on leaves of *Zea mays*, 12-V-1985, C. P. Reyes (**CPRC**); 5 females, 1 male, 4 immatures, Bo. Cale, Tanauan, Batangas, 15-XII-1978, A. Barrion (**IRRI**).

Distribution (Fig. 35). This species is widespread in the new world tropic. In the Philippine Archipelago, this species is known from the islands of Luzon and Visayas. PHILIPPINES: Luzon: UPLB, Los Banos, Laguna; Pansol, Calamba, Laguna; Bo. Cale, Tanauan, Batangas; Visayas: Gabok, Canlaon, Negros Occidental. TAIWAN. THAILAND. AUSTRALIA; U.S.A.: Hawaii; New Jersey; South Carolina; New York; Iowa; Florida; Tennessee; District of Columbia; Virginia. MEXICO. CUBA. PUERTO RICO.

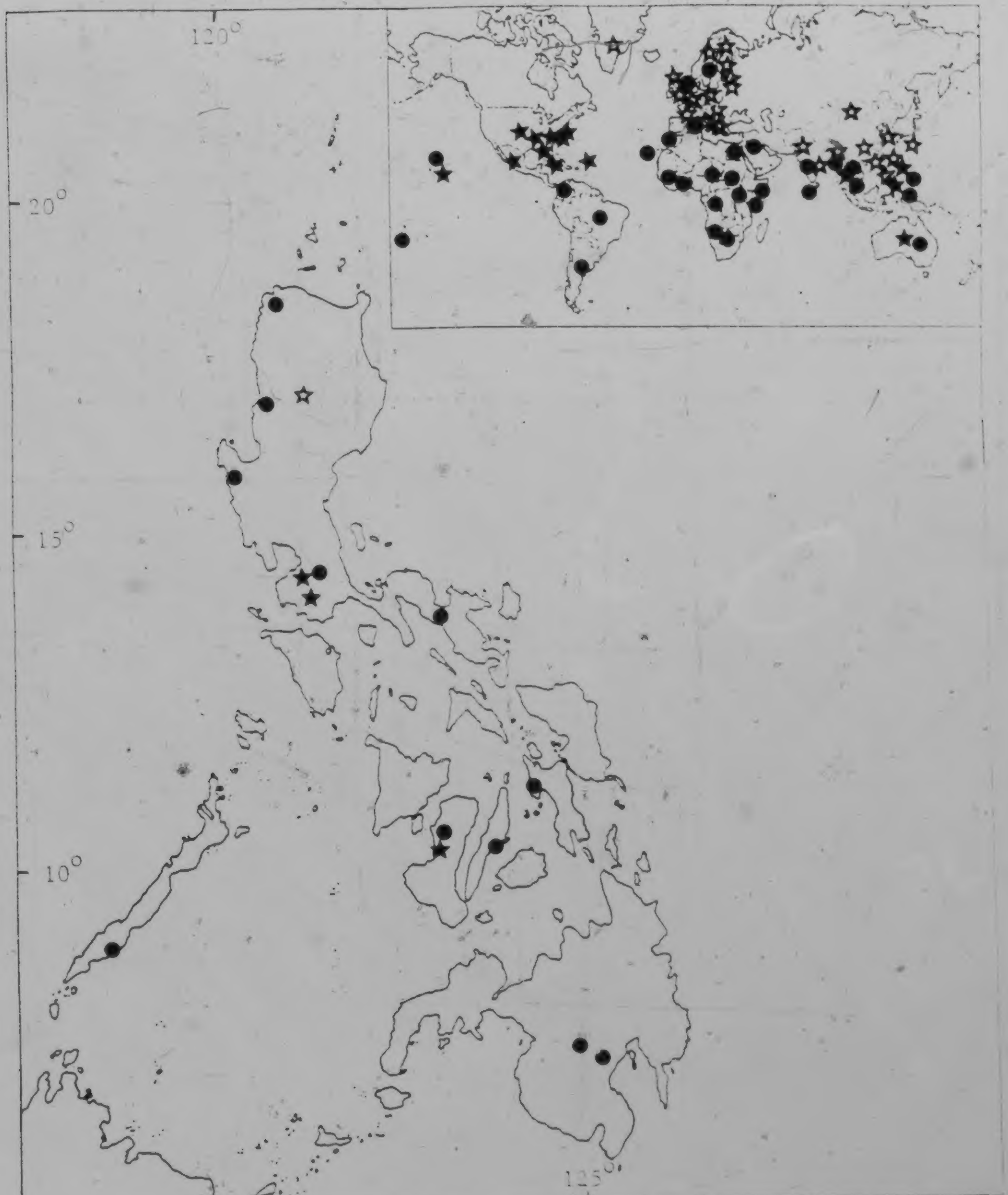
Hosts. Capco (1957) reported this species infesting leaves of corn. Hood (1915a) also found this species in large numbers in the husks of standing and freshly cut Indian corn in Washington D. C. This species was also collected from the following: *Anacardium occidentale*, *Saccharum officinarum*, blossoms of ragweed, flowers of aster, *Asclepias tuberosa*, *Sorghum vulgare*, and *Panicum pururascens*.

Fig. 35. Distribution of *Frankliniella* species in the Philippines, and world.

☆ *F. intonsa* (Trybom)

● *F. schultzei* (Trybom)

★ *F. williamsi* Hood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Genus *Fulmekiola* Karny

Fulmekiola Karny, 1925a: 18.
Type species: *Fulmekiola interrupta* Karny (= *Thrips serrata* Kobus, 1893), by original designation.

Diagnosis. Head usually wider than long. Ocellar setae pair I absent; II much longer than interocellars or pair III. Postocular setae not especially developed and not in row; pair I absent. Antennae 7-segmented; segments III and IV each with forked sense cone; segment II with mid dorsal seta basad of campaniform sensillum. Maxillary palpi 3-segmented.

Pronotum with 3 pairs of posteromarginal setae mesad major posteroangulars; epimeral and posteroangular setae long. Tarsi 2- segmented. Anterior vein of forewings with row of setae broadly interrupted; posterior vein with numerous setae; posterior fringe cilia wavy. Median pair of mesonotal setae far anteriad of posterior margin. Metascutum longitudinally striate. Meso and metasternal spinulae absent, present on mesosternum in few individuals.

Abdominal tergites V to VIII with lateral ctenidia, on VIII mesad spiracles. Seta S4 reduced on tergites VI to VIII. Tergites I to VIII and sternites II to VII or VIII in males, with long, regular teeth on posterior margins. Sternites II to V in females and II to VIII in males with all setae inserted at posterior margin. Males with transverse glandular area on each of sternites III to VII. Sternites without accessory setae.

The most distinctive characteristics of *Fulmekiola* adults are the long, regular teeth on the posterior margins of abdominal tergites and sternites, and their very long preocellar setae. The single species, *F. serrata*, is known from the Philippines.

***Fulmekiola serrata* (Kobus)**
Thrips serrata Kobus,1893: 158.
Type unknown, Indonesia: Java [**?Lost**] [not examined]
Thrips armata Moulton, 1936: 271-272. **New Synonym**

Diagnosis. Brown species. Head slightly constricted behind eyes. Preocellar setae longer than interocellars. Antennae 7-segmented; segment I brown; II to V pale; VI and VII brown; segment VI pale basally. Pronotum longer than wide, with small discal setae. Legs bicolored, moderately stout. Forewings brown, with pale base. Abdominal tergites I to VIII and sternites II to VII with long, regular teeth on posterior margin. Sternites without accessory setae.

I was able to examine specimens of *Fulmekiola serrata* from other countries but not the type material which I failed to locate, however, I have very little doubt that *Thrips armatus* Moulton is conspecific with this species. Moulton (1936) suspected such a relationship as indicated by his remarks when he described *T. armatus*. Bhatti (1980c) redescribed the monobasic genus *Fulmekiola* and the present interpretation of *F. serrata* (Kobus) fits very well with *T. armatus* Moulton. Jacot-Guillarmod (1975) had similar suspicions and suggested the possibility of such synonymy. Moreover, Sakimura (pers comm.) strongly supported the idea of treating *T. armatus* as a junior synonym of *F. serrata*. Members of both *F. serrata* and *T. armatus* are associated with sugarcane plant in the Orient.

Female macroptera. Head longer than wide, slightly constricted behind eyes; transversely striate. Interocellar setae short, outside ocellar triangle. Postocular setae short. Antennae 7-segmented and less than 2 times as long as head; segment I brown; II to V pale; VI brown with pale base; VII brown; segments III pedicellate; III and IV each with a forked sense cone. Mouthcone elongate, rounded.

Pronotum longer than wide, with transverse striae; discal setae small; posteroangular setae with inner pair slightly longer than outer pair. Legs moderately stout;

femora brownish yellow; tibiae and tarsi yellow. Forewings brown; basal quarter light brown; anterior vein with 7 basal and 3 distal setae; posterior vein with 10 to 14 setae; posterior fringe cilia wavy; scale light brown. Mesonotum striate. Metascutum transversely striate on anterior quarter, longitudinally striate on posterior three-quarters; median setae placed behind anterior margin; campaniform sensilla present.

Abdominal tergites nearly smooth; median setae small placed wide apart. Tergites I to VIII and sternites II to VII with long, regular teeth on posterior margins. Tergites IX and X with long, dark apical setae, with pointed apices. Sternites without accessory setae.

Male macroptera. Similar to female in structure. Abdominal tergite IX without thorn-like setae; B1 and B2 setae slender. Abdominal sternite VIII with long, regular teeth on posterior margin similar to those on tergites II to VII. Sternites III to VII each with small, transverse glandular area.

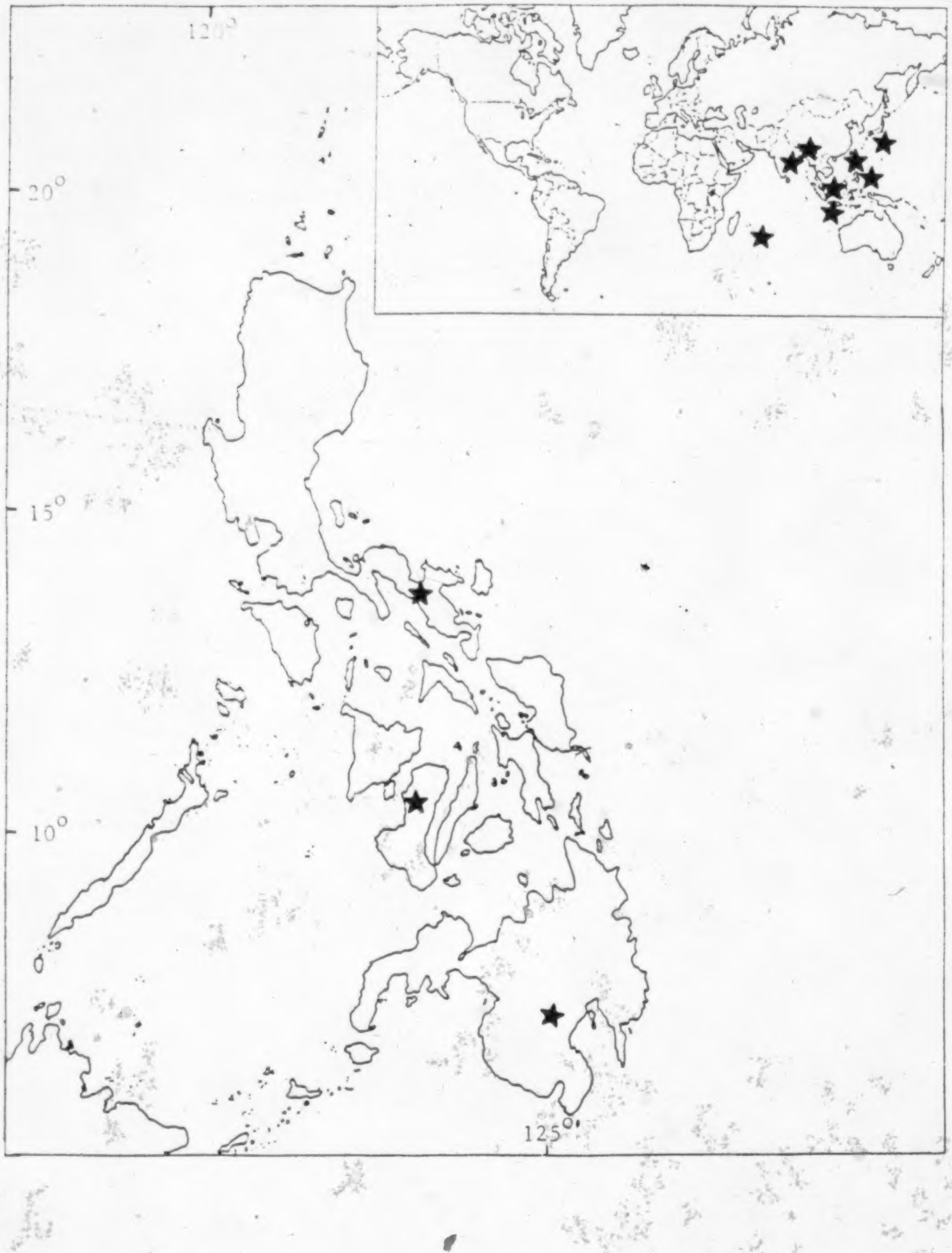
Material examined. **Holotype** female, *Thrips armata* Moulton, PHILIPPINES: Victorias, Negros Occidental, on *Citrus* seedlings 1927, W. D. Pierce (Moulton Coll.) (**CASC**). **Paratypes** (3 females, 7 males) same data as holotype. Others. 1 male, Hacienda Guicay, Manapla, Negros Occidental, on tip roller of [sugar]cane (*Saccharum officinarum*), 6-V-1928, W. D. Pierce; 5 females, Silay City; Hacienda, Guicay, Manapla; San Jose, Toctoc, Manapla, on sugarcane (*Saccharum officinarum*), 1927 to 1929, W. D. Pierce (Moulton Coll.) (**CASC**); 1 male, Goa, Camarines Sur, on *Saccharum officinarum*, 3-VI-1987, C. P. Reyes; 7 females, 1 male, La Granja, La Carlota, Negros Occidental, on *Saccharum officinarum*, 24 and 26-V-1987, C. P. Reyes; 1 female, on *Cajanus cajan*, 26-V-1987, C. P. Reyes; 4 females, Victorias, Negros Occidental, on *Saccharum officinarum*, 26-V-1987, C. P. Reyes; 13 females, 1 male, Aidsisa, Silay, Negros Occidental, on *Saccharum spontaneum*, 26-V-1987, C. P. Reyes; 1 female, Agko, Mt. Apo, on youngest leaf of *Saccharum officinarum*, 4-V-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 36). The known range of this species extends from India eastward in Taiwan, to the Indonesia Archipelago. In the Philippine Archipelago, this species is from the three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: Goa, Camarines Sur; Visayas: Victorias, Negros Occidental; La Granja, La Carlota, Negros Occidental; Aidsisa, Silay, Negros Occidental; Silay, Negros Occidental; Hacienda Guicay, Manapla, Negros Occidental; San Jose, Toctoc, Manapla; Mindanao: Agko, Mt. Apo. INDONESIA: Java. TAIWAN. MALAYSIA. JAPAN. INDIA. BANGLADESH. MAURITIUS.

Hosts. *Citrus* seedlings, *Saccharum officinarum*, youngest leaf of *Saccharum officinarum*, *Saccharum spontaneum* , tip roller of *Saccharum officinarum*, *Cajanus cajan*, *Nicotiana tabacum*

Fig. 36. Distribution of *Fulmekiola serrata* (Kobus) in the Philippines, and world.

★ *F. serrata* (Kobus)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Genus *Javathrips* Bhatti

Javathrips Bhatti, 1978a. 176-177.
Type species: *Taeniothrips lagoenifer* Priesner, by original designation.

Diagnosis. Head about as long as broad, or slightly longer; vertex distinctly produced into preocellar process. Ocellar setae pair I absent. Postocular setae uniserial or biserial. Eyes protruding. Cheeks constricted behind eyes. Antennae 8- segmented,with forked sense cone on each of segments III and IV; IV in distal fourth to third narrow, parallel-sided or tubular; V with 2 sense cones; microtrichia present on segments III-V. Maxillary palpi 3- segmented. Mouthcone short, conical.

Pronotum wider than long; posteroangular setae developed; posteromarginal setae mesad of major angulars 2 pairs; surface moderately setose, with transverse striae. Tarsi 2-segmented. Forewings with series of anterior vein setae broadly interrupted; posterior vein with numerous setae; posterior fringes wavy; apical setae less than twice length of preapical setae. Mesonotum transversely striate with median pair of setae far ahead of posterior margin. Mesosternal spinula present. Metasternal spinula absent.

Median setae on abdominal tergites I-VIII wide apart. Posterior margins of tergites II-VII with or without short microtrichia laterally. Tergite VIII with scattered microtrichia anteriad of spiracles, posterior margin with comb of microtrichia. Tergite X entire or divided only at apex. Pleurites sclerotized, with posterior teeth. Sternal accessory setae absent. Males with transverse glandular area on each of abdominal sternites III-VII; tergite IX without thorn-like setae; phallus armed with pair of spikes.

Three species belonging to *Javathrips* are known from Indonesia (Bhatti, 1978a). This genus is represented by 2 new species *J. ciliaris* and *J. variegatus* from the Philippines.

Key to Philippine species of *Javathrips* Bhatti

1 Abdominal tergites II to VII with short microtrichia on posterior margins; interocellar setae 60 um long (Fig. 37a); forefemora and foretibiae yellow .... *J. ciliaris*, n. sp.

1' Abdominal tergites II to VII without microtrichia on posterior margins; interocellar setae 65 to 80 um long (Fig. 38a); forefemora and foretibiae brown .... *J. variegatus*, n. sp.

***Javathrips ciliaris*, n. sp.**
Holotype female, Philippines: Agko, Mt. Apo (UPLB)
Figure 37a, b, c, d, e, f

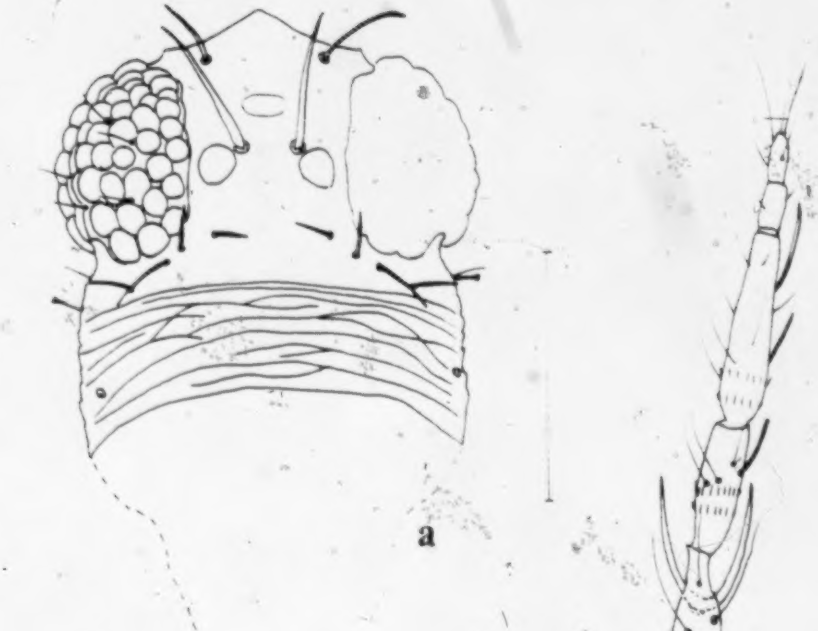
Diagnosis. Body dark brown. Head transversely striate posteriorly. Interocellar setae longer than postoculars. Cheeks incut behind eyes. Antennal segments III and IV with tubular apices, each with long, forked sense cone. Pronotal posteromarginal setae mesad angulars usually 3 pairs; posteroangulars subequal. Legs yellowish with mid and hindfemora shaded with light brown medially. Forewings broad, brown, with median area of basal quarter lightly shaded. Posterior margins of abdominal tergites II to VII with fine microtrichia laterally. Posterior margin of tergite VIII with comb of developed microtrichia.

Adults of this species resemble those of the Indonesian species, *J. cyrtandrae* Priesner in having a few, fine microtrichia laterally on the posterior margins of abdominal tergites II to VII. Members of *J. ciliaris*, n. sp. differ from those of the latter in having shorter interocellar and pronotal posteroangular setae; mid and hindfemora shaded with light brown medially; forewings with median area of basal quarter lightly shaded with brown; and in the shape of sternal glandular areas in males.

Female macroptera. Head dark brown, widest at base; transversely striate posteriorly (Fig. 37a). Preocellar and interocellar setae developed; interocellar setae within ocellar triangle. Eyes protruded. Postocular setae shorter than ocellars. Cheeks incut behind eyes. Antennae more than 2.0 times as long as head; segments I and II brown; III yellow; IV to VIII light brown; base of segments IV and V pale; segments III and IV each with a forked sense cone; apices of segment III and IV nearly tubular (Fig. 37b). Mouthcone elongate, rounded (Fig. 37a).

Lateral margins of thorax dark brown. Pronotal major setae developed; posteromarginal setae mesad of angulars usually 3 pairs, sometimes 7 setae; inner pair of posteroangular setae longer than outer pair (Fig. 37c). Legs yellowish; mid and hind

Fig. 37. *Javathrips ciliaris*, n. sp., female holotype. a. Head b. Right antenna c. Pronotum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femora shaded with light brown medially; tibiae with numerous setae; hindtibiae with row of spine-like setae on inner margins. Forewings broad; brown, median area of basal quarter lightly shaded; anterior vein with 7 basal and 3 distal setae; posterior vein with 12 setae; posterior fringe cilia slightly wavy; scale light brown (Fig. 37d). Mesonotum with transversely anastomosed striae. Metanotum with transversely anastomosed striae on anterior third, reticulate on posterior two-third; median setae long, behind anterior margin.

Abdominal tergites reticulate laterally; median setae small, placed wide apart. Posterior margins of tergites II to VII with fine microtrichia laterally. Tergite VIII with scattered microtrichia anteriad each spiracle; posterior margin with complete comb of developed microtrichia. B1 and B2 setae of tergites IX and X developed, and dark. Tergite X entire. Sternites without accessory setae.

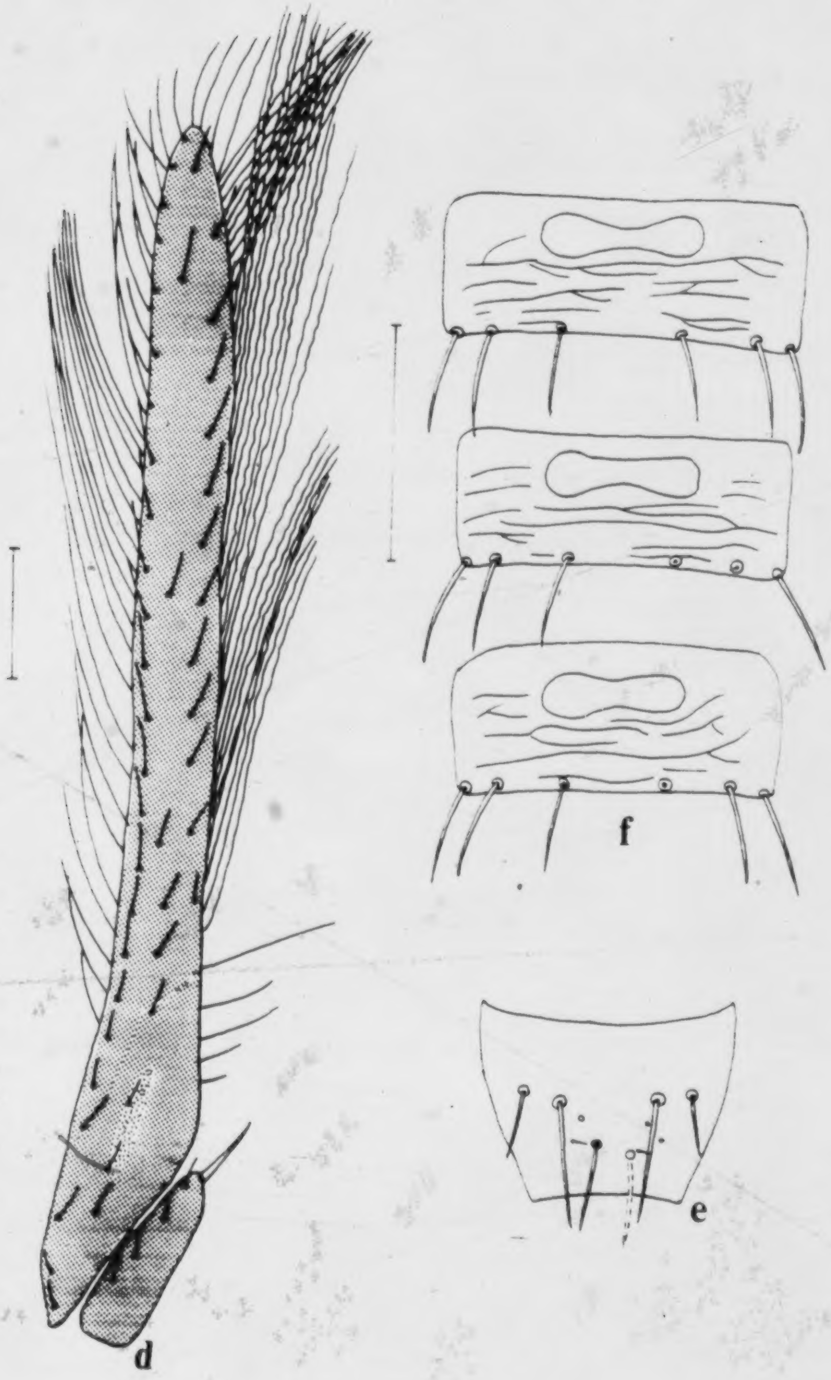
Dimensions (holotype female; um). Body length (extended) 1693.2. Head length 142.8, median width 146.2; interocellar setae length 54.4; postocular setae I length 17; dorsal eye length 71.4; antennal segments length: I 25.5; II 45.9; III 68; IV 73.1; V 51; VI 76.5; VII 18.7; VIII 18.7. Pronotum length 139.4, median width 210.8, major setae length: pa I 81.6; pa II 66.3.

Type data. **Holotype** female, PHILIPPINES: Agko, Mt. Apo, on leaves of *Musa textilis*, 3-V-1987, C. P. Reyes (**UPLB**). **Paratypes** (4 females, 2 males) same data as holotype (**UPLB**).

Male macroptera. Similar to female in structure but smaller and and more pale. Abdominal tergite IX with moderately stout median setae (Fig. 37e). Sternites III to VII each with a transverse, elongate, medially narrowed glandular area (Fig. 37f).

Dimensions (allotype male; um). Body length (extended) 1434.8. Head length 142.8, median width 129.2; interocellar setae length 59.5; postocular setae I length 17; dorsal eye length 68; antennal segments length: I 28.9; II 39.1; III 57.8; IV 64.6; V 45.9;

Fig. 37. *Javathrips ciliaris*, n. sp., female holotype. d. Forewing e. Male allotype, abdominal tergite IX f. Male allotype, abdominal sternites V to VII


f
e
d

VI 73.1; VII 18.7; VIII 15.3. Pronotum length 125.8, median width 173.4, major setae length: pa I 64.6; pa II 64.6.

Material examined. Type series only (**UPLB**).

Etymology. Ciliaris is a Latin word meaning "ciliate" in reference to the microtrichia on the posterior margin of abdominal tergites II-VIII of these thrips.

Distribution (Fig. 39). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo.

Host. leaves of *Musa textilis*

***Javathrips variegatus*, n.sp.**
Holotype female, Philippines: Sagpangan, Agko, Mt. Apo (**UPLB**)
Figure 38a, b, c, d, e, f

Diagnosis. Body dark brown. Head transversely striate posteriorly. Eyes protruded. Postocular setae about as long as preocellars. Cheeks constricted behind eyes. Antennae more than 2.0 times as long as head; segments III and IV yellowish, each with long, forked sense cone. Pronotal posteromarginal setae mesad angulars usually 2 pairs, sometimes 3 pairs; posteroangular setae subequal. Legs bicolored brown and yellow. Forewings brown, with basal quarter lightly shaded medially. Posterior margins of tergites II to VII without microtrichia. Posterior margin of tergite VIII with complete comb of microtrichia.

This species differ from *J. ciliaris* n. sp. in shape of sternal glandular areas in males and by the absence of lateral microtrichia on tergites II to VII in both sexes.

Female macroptera. Head transversely striate posteriorly (Fig. 38a). Ocellar and interocellar setae developed. Eyes protruding. Postocular setae about as long as preocellars. Cheeks constricted behind eyes. Antennae more than 2 times as long as head; segments I, II, VI to VIII brown; III yellow; IV to V yellow, with light brown apices; III and IV each with forked sense cone; segment VIII longer than segment VII (Fig. 38b). Mouthcone short and narrowly rounded (Fig. 38a).

Pronotal major setae developed; posteromarginal setae mesad angulars 2 to 3 pairs; posteroangular setae with inner pair longer than outer pair (Fig. 38c). Femora dark brown; foretibiae light brown, with pale apices; mid and hindtibiae brown with pale bases and apices; tarsi yellow. Forewings brown; basal quarter slightly shaded medially; anterior vein with 7 to 9 basal and 3 distal setae; posterior vein with 10 to 11 setae; posterior fringe cilia slightly wavy; scale brown (Fig. 38d). Mesonotum transversely striate. Metascutum reticulate; median setae behind anterior margin.

Fig. 38. *Javathrips variegatus*, n. sp., female holotype. a. Head b. Right antenna c. Pronotum

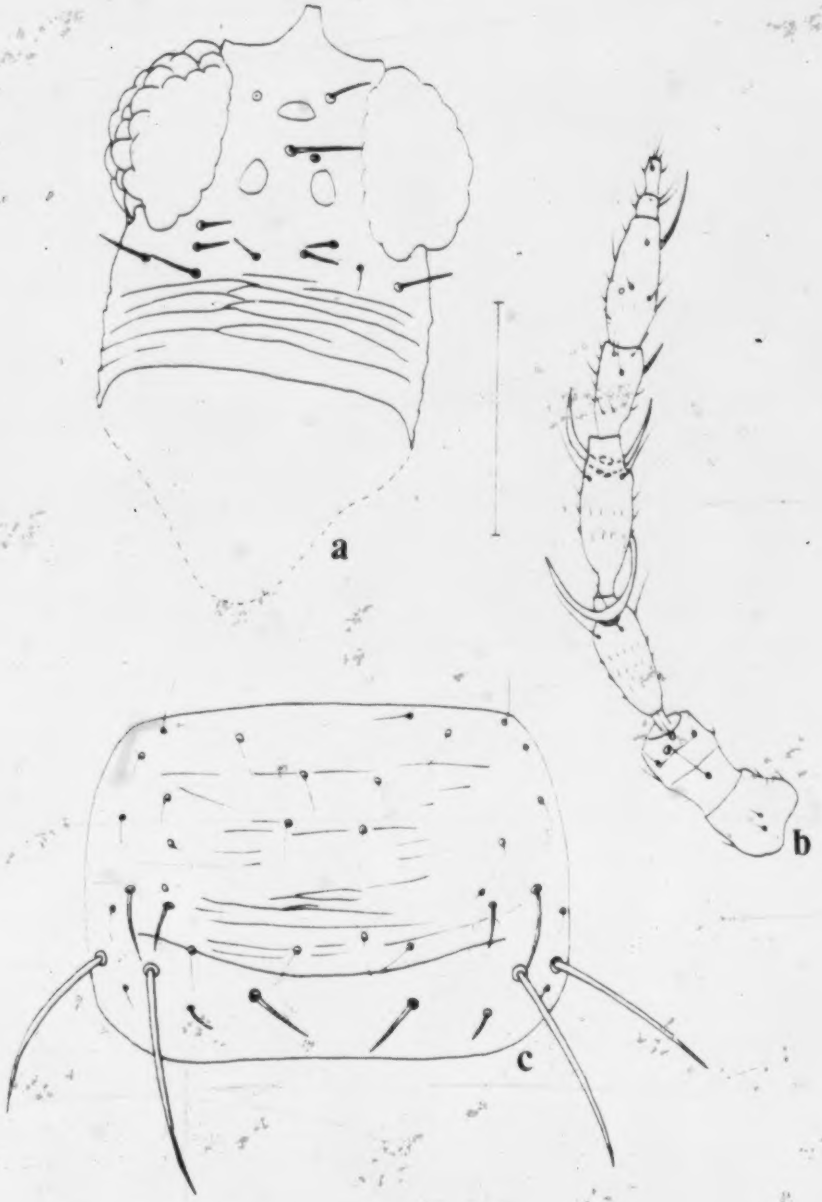

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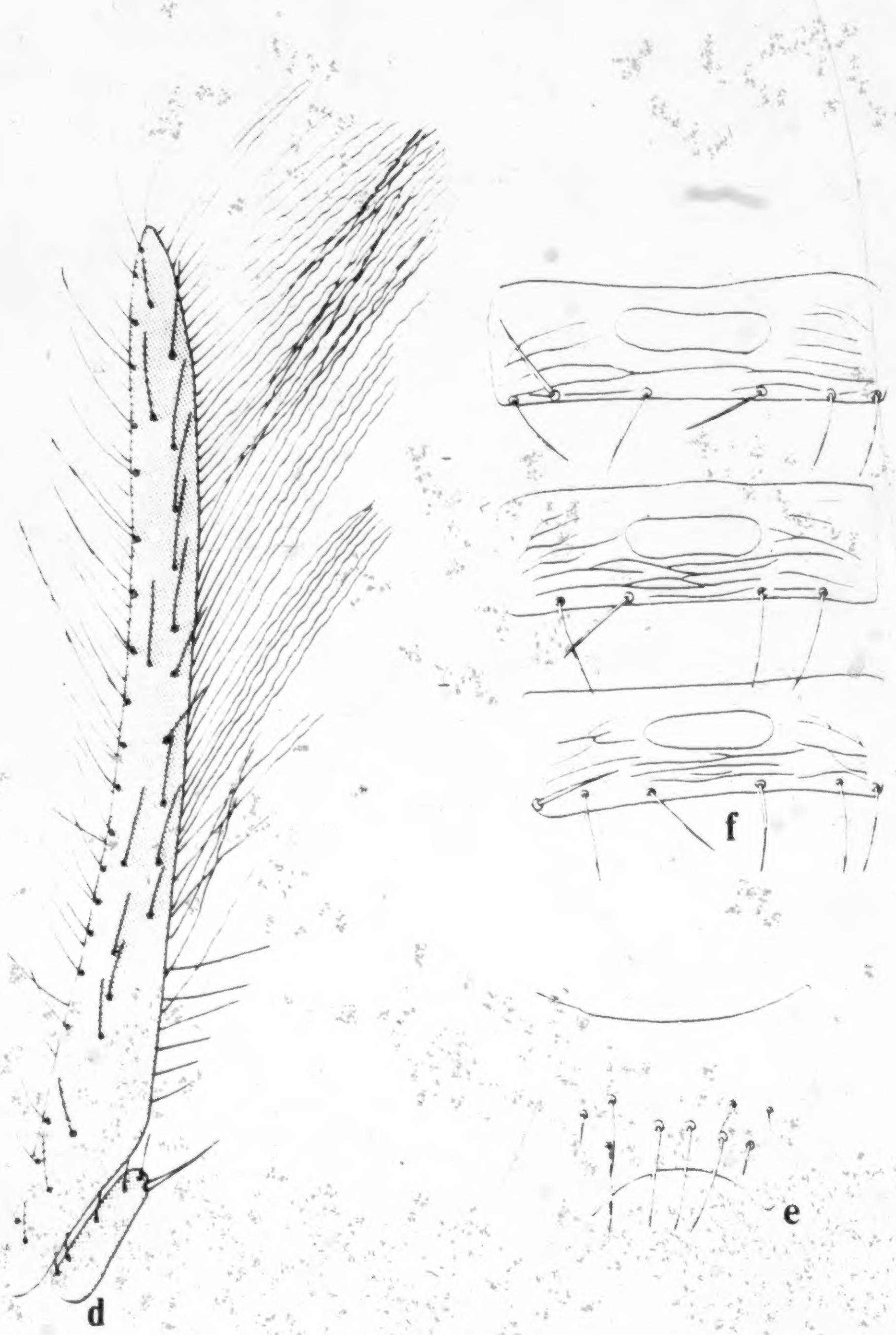
Fig. 38. *Javathrips variegatus*, n. sp., female holotype. d. Forewing. e. Male allotype, abdominal tergite IX. f. Male allotype, abdominal sternites V to VII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Abdominal tergites reticulate laterally, smooth medially; median setae small. Posterior margins of tergites II to VII without microtrichia. Tergite VIII with complete comb of microtrichia on posterior margin. B1 and B2 setae on tergites IX and X dark and well developed. Tergite X entire. Sternites without accessory setae.

Dimensions (holotype female; um). Body length (extended) 1652.4. Head length 156.4, median width 190.4; interocellar setae length 25.5; postocular setae I length 18.7 ; antennal segments length: I 30.6; II 40.8; III 62.9; IV 64.9; V 37.4; VI 54.4; VII 12.8; VIII 16.2. Pronotum length 136, median length 183.6; major setae length: pa I 119; pa II 102.

Type data. **Holotype** female, PHILIPPINES: Sagpangan, Agko, Mt. Apo, on unknown shrub, 5-V-1987, C. P. Reyes (**UPLB**). **Paratypes** (4 females, 3 males) same data as holotype (**UPLB**).

Male macroptera. Similar to female in structure but body smaller and and more pale. Abdominal tergite IX with moderately stout, median setae (Fig. 38e). Sternites III to VII each with transverse glandular area, not so conspicuously narrowed medially (Fig. 38f).

Dimensions (allotype male; um). Body length (extended) 1373.6. Head length 125.8, median width 132.6; interocellar setae length 59.5; postocular setae I length 18.7; antennal segments length: I 27.2; II 35.7; III 52.7; IV 54.4; V 39.1; VI 61.2; VII 10.2; VIII 15.3. Pronotum length 129.2, median width 180.2, major setae length: pa I 102; pa II 95.2.

Material examined. Type series. Others: 1 female, Agko, Mt. Apo, sweeping grass, 5-V-1987, C. P. Reyes; 11 females, 4 males, Agko, Mt. Apo, on leaves of unknown shrub, 4-V-1987, C.P.Reyes; 1 female, La Granja, La Carlota, Negros Occidental, on leaf of "tisa" tree, 26-V-1987, C. P. Reyes (**CPRC**).

Etymology. Variegatus is a Latin word meaning "variable" in reference to the variable number of posteromarginal setae mesad to the major angulars on the pronotum of these thrips.

Distribution (Fig. 39). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Visayas and Mindanao.

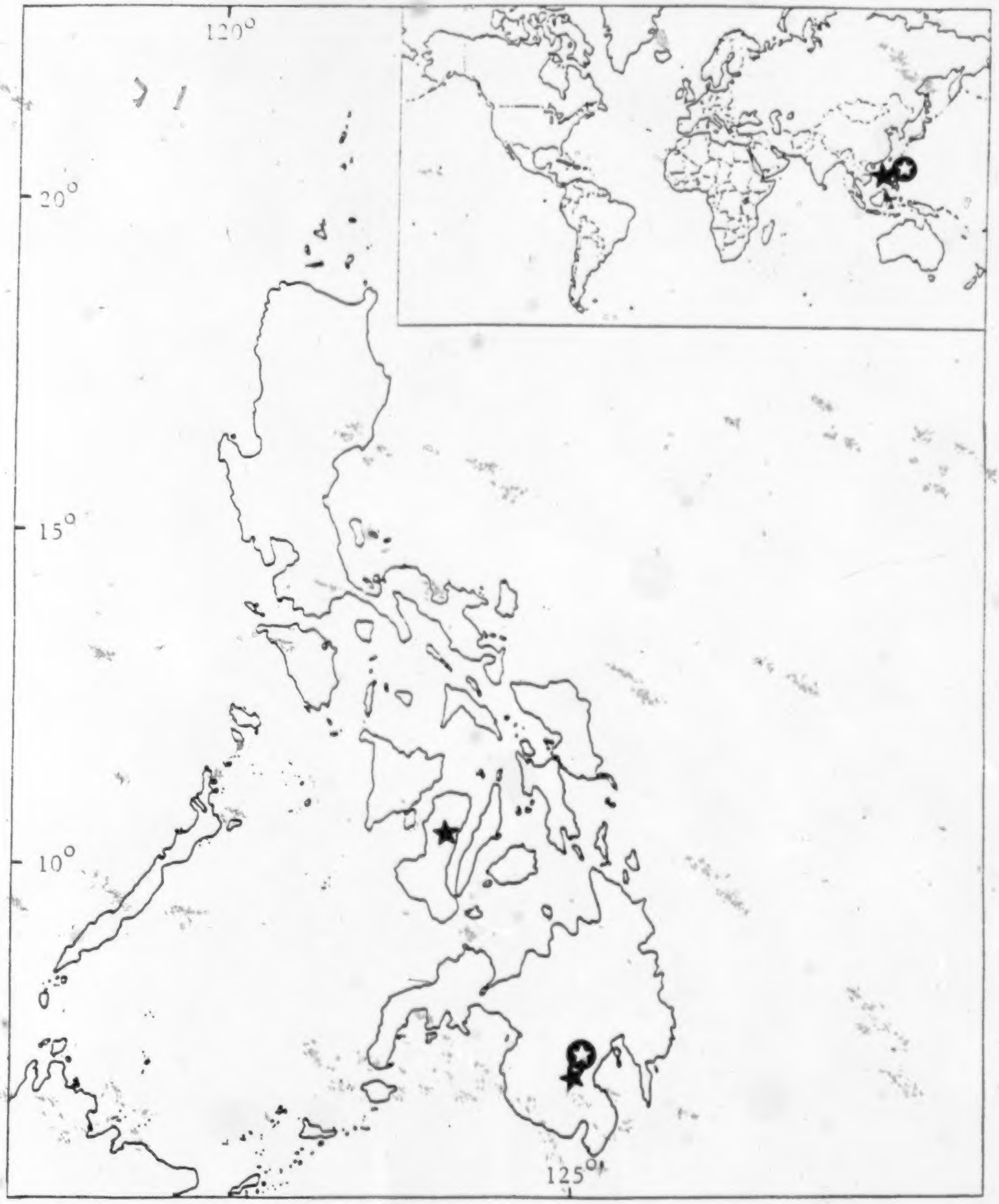
PHILIPPINES: Visayas: La Granja, La Carlota, Negros Occidental; Mindanao: Sagpangan, Agko, Mt. Apo; Agko, Mt. Apo.

Hosts. unknown shrub, sweeping grass, leaves of unknown shrub, leaf of "tisa" tree

Fig. 39. Distribution of *Javathrips* species

✪ *J. ciliaris*, n. sp.

★ *J. variegatus*, n. sp.


120°
20°
15°
10°
125°

Genus *Lefroyothrips* Priesner

Lefroyothrips Priesner, 1938: 499 (as subgenus of *Taeniothrips*)
Type species: *Physothrips lefroyi* Bagnall, by original designation.

Diagnosis. Head wider than long, with transverse striations posteriorly. Ocellar setae pair I present; interocellar setae longest. Postocular setae vestigial. Eyes slightly or distinctly prolonged ventrally. Antennae 8-segmented; segments III and IV each with a forked sense cone; segment VI long. Mouthcone narrowly rounded.

Pronotum broad, setose; posteromarginal setae 6 pairs; posteroangular setae well developed. Forelegs slightly thickened; hindtibiae with row of spine-like setae on inner margins. Forewings banded; anterior vein with 1 median and 2 or 3 distal setae; posterior vein with complete series of setae. Mesonotum with transverse striae medially. Mesosternal spinula present. Metasternal spinula absent.

Abdominal tergite VIII with scattered microtrichia anterior to spiracles, posteromarginal comb of microtrichia present. Tergite X not completely divided longitudinally. Sternites without accessory setae. In male, tergite IX with thorn-like setae.

Adults of *Lefroyothrips* species are distinguished from those of *Ceratothrips* Reuter in having only 6 pairs of pronotal posteromarginal setae and a short, complete comb of fine, long microtrichia on the posterior margin of tergite VIII, and stout, thorn-like setae on male abdominal tergite IX. Bhatti (1978a) revived and elevated *Lefryothrips* to the generic level. This genus includes 8 species mainly from the orient (Mound and Houston, 1987). *L. fasciatus* and *L. lefroyi* are known from the Philippines.

Key to Philippine species of *Lefroyothrips* Priesner

1 Antennal segments I and III yellow, II and IV brown; apex of forewings pale; body yellow.. *L. lefroyi* (Bagnall)

1' Antennal segments I to IV yellow; apex of forewings brown; body bicolored.. *L. fasciatus* (Moulton)

***Lefroyothrips fasciatus* (Moulton)**
Taeniothrips (Lefroyothrips) fasciatus Moulton, 1940: 250.
Ceratothrips fasciatus (Moulton); Jacot-Guillarmod, 1974: 732.
Holotype female, New Guinea: Koitaki (**BPBM**) [examined]

Diagnosis. Body bicolored. Head, pro- and metanota yellow; mesonotum and abdomen bicolored yellow and brown. Head widest toward base. Interocellar setae about as long as preocellars, placed inside ocellar triangle. Antennal segments I to IV, basal half of V and base of VI yellow; apical half of segment V and segments VII and VIII brown. Pronotum with developed discal setae. Legs yellow. Forewings yellow with median brown cross band; apical quarter brown. Metascutum with submedian setae longer than median setae. Abdominal tergite VIII with complete comb of microtrichia on posterior margin. Tergites IX and X with long, dark apical setae. Tergite X completely divided longitudinally.

This is the first record of *L. fasciatus* in the Philippines. Bhatti (1978a) transferred this species to *Lefroyothrips*.

Female macroptera. Head wider than long, widest towards base; transversely striate posteriorly. Eyes large, about 0.7 times as long as head. Preocellar setae developed. Interocellar setae more than 2 times as long as preocellars and placed inside ocellar triangle. Postocular setae developed. Antennae about 1.7 times as long as head; segments I to IV, basal half of V and base of VI yellow; apical half of V and segments VII and VIII brown; III pedicellate; segments III and IV each with a forked sense cone; segment VIII about 2 times as long as VI. Mouthcone narrowly rounded.

Pronotum smooth; discal setae developed; posteroangular setae with inner pair longer than outer pair. Legs yellow; forefemora slightly enlarged. Forewings yellow, with median brown cross band; apical quarter brown; anterior vein with 7 basal and 3 apical setae; posterior vein with 16 setae. Mesonotum brown anteriorly, transversely striate. Metascutum with striae; median setae long, near anterior margin; submedian setae stout, longer than median setae; lateral setae on small tubercle.

Abdominal tergites bicolored yellow and brown. Tergites II and VII brown in anterior two-thirds, yellow in posterior third. Tergite IX yellow in anterior two-thirds, brown in posterior third. Tergite X yellow in anterior third, brown in posterior two-thirds. Tergite VIII with complete comb of microtrichia on posterior margin. Tergites IX and X with long, dark apical setae, pointed at apex. Tergite X divided longitudinally.

Male macroptera. Similar to female in structure. Apical third of abdominal tergites IX and X deep brown. Tergite IX with 3 pairs of dark, thorn-like setae, inner pair longer and placed closer together than outer pairs. Not yet known from the Philippines.

Material examined. **Paratypes** (1 female, 2 males) 15- IX-1928, Koitaki, New Guinea (Moulton Coll.) (**CASC**). 1 female, Aborlan, Palawan, on flower of unknown shrub, 25-V-1987, C. P. Reyes; 1 female, Mlang, North Cotabato, on *Sandoricum koetjape*, 17-II-1985, C. P. Reyes (**CPRC**).

Distribution (Fig. 40). The known range of this species extends from the Philippine Archipelago to Papua New Guinea. In the Philippines, this species is known from the islands of Palawan and Mindanao. PHILIPPINES: Palawan: Aborlan; Mindanao: Mlang, North Cotabato. PAPUA NEW GUINEA.

Hosts. flower of unknown shrub, *Sandoricum koetjape*

Lefroyothrips lefroyi **(Bagnall)**
Physothrips lefroyi Bagnall, 1913a: 292.
Ceratothrips lefroyi (Bagnall); Jacot-Guillarmod, 1974: 735.
Syntypes male, female, India: Lebong, Darjeeling, Bengal (**TMNH**)[examined]

Diagnosis. Body yellow. Head widest towards base. Interocellar setae about 2 times as long as postocular setae, inside ocellar triangle. Antennal segments I and III yellow; II and segments IV to VIII brown; bases of segments II, IV and V pale. Pronotum moderately setose. Legs yellow. Forewings yellow, with 2 narrow brown cross bands; apex pale. Metascutum with median setae much longer than submedian setae. Abdominal tergite VIII with complete comb of microtrichia on posterior margin. Tergite IX and X with long, dark apical setae, pointed at apex. Tergite X entire.

This is the first record of *L. lefroyi* in the Philippines. Bhatti (1978a) transferred this species to *Lefroyothrips*.

Female macroptera. Head wider than long, widest towards base; transversely striate posteriorly. Interocellar setae more than 2.0 times as long as postocular setae, placed inside ocellar triangle. Postocular setae longer than preocellar setae. Antennal segments I and III yellow; II and IV to VIII brown, bases of segments II, IV and V pale; III pedicellate; segments III and IV each with forked sense cone. Mouthcone narrowly rounded.

Pronotum smooth, moderately setose; posteroangular setae with inner pair about as long as outer pair. Legs yellow; forefemora slightly enlarged. Forewings yellow with 2 narrow, dark cross bands; apex pale; anterior vein with 7 basal, 2 distal setae; posterior vein with 14 setae. Mesonotum faintly striate. Metascutum with striae to nearly smooth; median setae much longer than submedian setae, placed near anterior margin.

Abdomen smooth. Tergite VIII with complete comb of microtrichia on posterior margin. Tergites IX and X with long, dark apical setae, pointed at apex. Tergite X entire. Sternites without accessory setae.

Male. Similar to female in structure but smaller. Abdominal tergite IX with 3 pairs of stout, pale, spine-like setae, inner pair stouter and placed slightly anterior of the outer pairs. Not yet known from the Philippines.

Material examined. 1 female, VISCA, Baybay, Leyte, on Fabaceae, 9-V-1983, C. P. Reyes (**CPRC**).

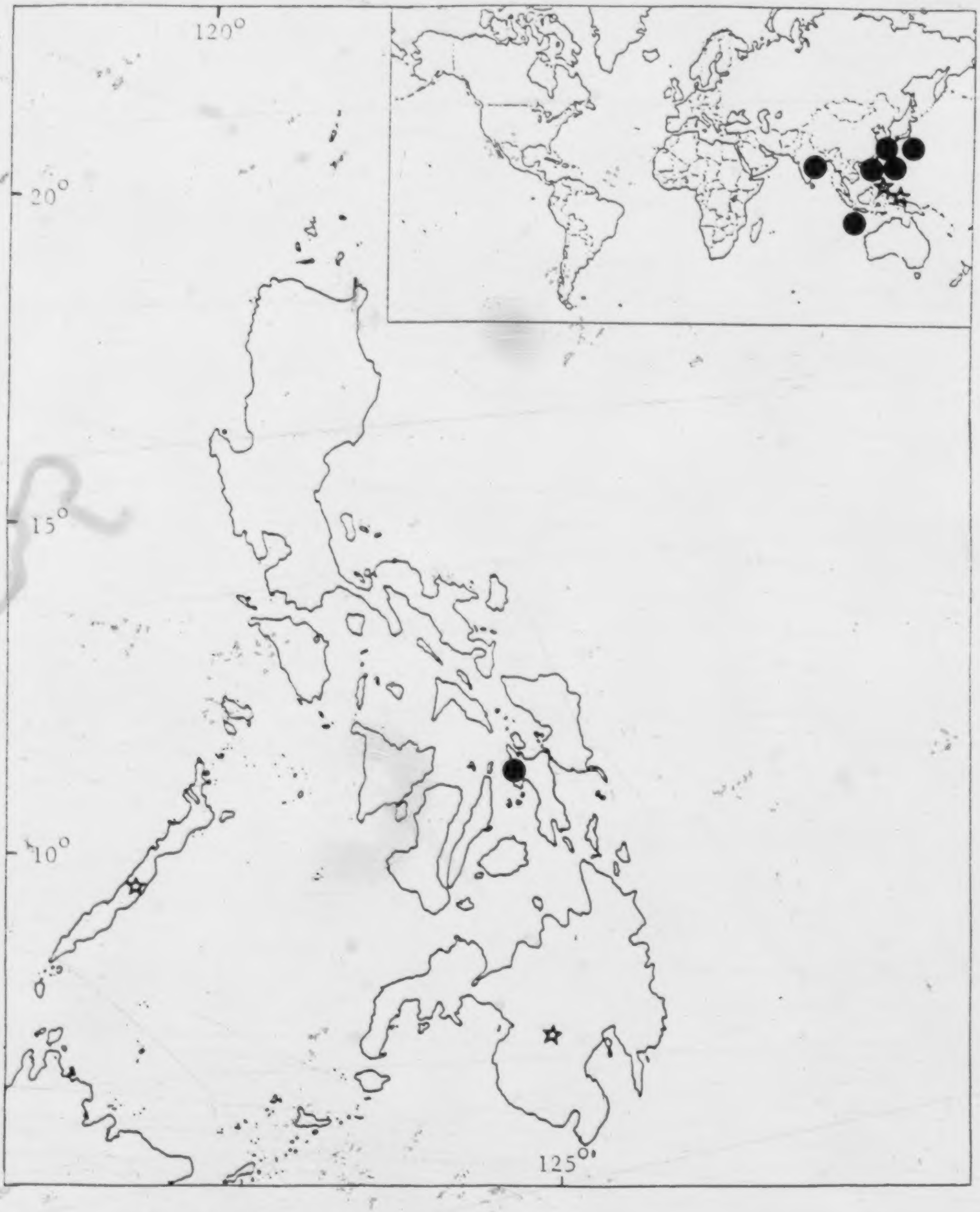
Distribution (Fig. 40). The known range of this species extends from India eastward in Southeast Asia, to the Indonesia Archipelago. In the Philippine Archipelago, this species is known from the island of Visayas. PHILIPPINES: Visayas: VISCA, Baybay, Leyte. INDIA. HONGKONG. INDONESIA: Java, Sumatra. JAPAN. TAIWAN.

Host. on Fabaceae

Fig. 40. Distribution of *Lefroyothrips* species in the Philippines, and world.

☆ *L. fasciatus* (Moulton)

● *L. lefroyi* (Bagnall)


120°
20°
15°
10°
125°

Genus *Megalurothrips* Bagnall

Megalurothrips Bagnall, 1915:589.
Type species: *Megalurothrips typicus* Bagnall, by original designation and monotypy.

Diagnosis. Head wider than long, with transverse striations posteriorly. Ocellar setae pair I present; interocellar setae longest. Postocular setae developed. Eyes large, about half as long as head. Antennae 8-segmented; segments III and IV each with forked sense cone; segment VI long. Mouthcone elongate, almost pointed.

Pronotum broad, setose; posteromarginal setae 7 pairs; posteroangular setae developed. Forefemora slightly thickened, hindtibiae with spine-like setae. Forewings banded; anterior vein setae almost complete or interrupted beyond middle; posterior vein with complete row of setae; posterior fringe cilia wavy. Mesonotum with long setae laterally. Mesosternal spinula present. Metasternal spinula absent.

Abdominal tergite VIII with comb of microtrichia on posterior margin, and with scattered microtrichia anterolateral to spiracles. Tergite X not completely divided longitudinally. Sternites without accessory setae. Male with thorn-like setae on tergite IX.

Adults of *Megalurothrips* are medium-sized, pale to dark brown thrips having 3 pairs of ocellar setae (long interocellar setae as in *Ceratothrips* Reuter and *Lefroyothrips* Priesner), numerous setae on the anterior vein of the forewings and with tergite VIII of females with a group of microtrichia laterally in front of each spiracle. Representative of this genus differ from those of the above genera mainly in the shape of antennal segments, number of pronotal posteromarginal setae mesad of the postangulars, and in forewing chaetotaxy. *Megalurothrips* includes about 8 species from the old world tropics all usually associated with leguminous plants (Mound and Houston, 1987).

Key to Philippine species of *Megalurothrips* Bagnall

1 Abdominal sternite VII with posteromarginal setae inserted along posterior margin; antennal segment III and basal half and apical neck of segment IV yellow .... *typicus* (Bagnall)

1' Abdominal sternite VII with median pair of posteromarginal setae inserted anterior to posterior margin 2

2(1') Antennal segment III yellow; ocellar setae pair III 2.5 times as long as the distance between their bases; males without sternal accessory setae .... *usitatus* (Bagnall)

2' Antennal segment III brown; ocellar setae pair III usually 3.0 to 4.0 times as long as the distance between their bases; males with numerous lanceolate sternal accessory setae.. *distalis* (Karny)

Megalurothrips distalis Karny
Taeniothrips distalis Karny,1913a: 122.
Holotype female, Japan: Okajima (**Berlin**) [not examined]
Taeniothrips distalis Karny; Moulton, 1936:267.

Diagnosis. Body dark brown. Head as long as wide. Interocellar setae about 3 to 4 times as long as distance between their bases. Antennae brown. Forefemora brown with pale apices. Forewings brownish, pale subbasally and subapically. Metascutum transversely reticulate. Abdominal tergite VIII with comb of microtrichia on posterior margin interrupted medially . Sternite VII with posteromarginal setae placed anterior to posterior margin.

Adult females of *M. distalis* are difficult to separate from those of *M. peculiaris* except for the length of the base of the inner sense cone on antennal segment VI which is rather long in *M. peculiaris* . The males can be separated from those of *M. peculiaris* in having lanceolate posteromarginal setae on sternite VII. I find these characters weak. For Philippine specimens, I chose to place specimens possessing such characters under *M. distalis*. I suspect that these two species are conspecific but more specimens are needed before a final decision can be made.

Female macroptera. Head about as wide as long; transversely striate posteriorly. Preocellar setae about as long as postoculars. Interocellar setae 3 to 4 times as long as distance between their bases. Postocular setae developed. Antennae brown; segments III and IV each with a moderately long, forked sense cone. Mouthcone elongate, narrowly rounded.

Pronotum transversely striate; anteroangular setae prominent; posteroangular setae subequal. Forefemora brown with pale apices; foretibiae uniformly light brown; mid and hindfemora and tibiae brown; all tarsi yellowish; hindtibiae with 2 spine-like setae at inner apex. Forewings generally brown, pale subbasally and subapically; anterior vein with 2 dark distal setae; posterior fringe cilia wavy. Mesonotum with widely spaced, transverse striae. Metascutum transversely reticulate on anterior half, reticulate on posterior half; longitudinally striate laterally; median setae placed at or near anterior margin; campaniform sensilla present.

Abdominal tergite I transversely striate. Tergites II to VII smooth medially, transversely striate laterally; median setae short close together or far apart. Tergite VIII with comb of microtrichia on posterior margin interrupted medially . Tergites IX and X each with long, dark apical setae, pointed at apex. Sternite VII with median pair of posteromarginal setae anterior to posterior margin.

Male macroptera. Similar to female in structure. Antennae and forelegs lighter in color. Abdominal sternites II to VIII with numerous lanceolate accessory setae; glandular area absent; posteromarginal setae lanceolate, similar to accessory setae.

Material examined. 1 female, Laguna, on legume, 20-X-1931, I. D. Dobrosky (Moulton Coll.) (**CASC**); 1 female, MSAC, La Trinidad, Mt. Province, on *Hibiscus rosa-sinensis*, 8-XII-1984, C.P.Reyes; 3 females, on *Helianthus annuus* and *Desmodium triflorum*, 8-XII-1984, C. P. Reyes; 1 female, Wright Park, Baguio City, on *Desmodium* sp., 8-XII-1984, C. P. Reyes; 1 female, UPLB, Los Banos, Laguna, on *Sliricedium sepium*, 2-III-1985, Oratai and Chantana; 6 females, Putinglupa, Calamba, Laguna, on *Sliricedium sepium*, 5-II-1983, C. P. Reyes; 1 female, on *Cajanus cajan*, 5-II-1983, C. P. Reyes; 1 female, Bo. Manggahan, Dolores Quezon, unknown grass, 9-III-1987, R. Casinas; 2 females, sweeping grass, 4-III-1987, R. Casinas; 1 female, Agko, Mt. Apo, on flower of everlasting, 4-V-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 41). The known range of this species extends from India eastward in the Indo-Australia Archipelago, to the Pacific Islands. In the Philippine Archipelago, this species is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: UPLB, Los Banos, Laguna; Laguna; Putinglupa, Calamba, Laguna; Bo. Manggahan, Dolores, Quezon; MSAC, La Trinidad, Mt. Province; Wright Park, Baguio City; Mindanao: Agko, Mt. Apo. JAPAN. KOREA. TAIWAN. CHINA. INDONESIA: Java;

Sumatra; Krakatua. BANGLADESH. INDIA. SRI LANKA. NEW ZEALAND. AUSTRALIA. CAROLINE IS. FIJI.

Hosts. legume, *Hibiscus rosa-sinensis*, *Helianthus annuus*, *Desmodium florum*, *Desmodium* sp., *Sliricedium sepium*, *Cajanus cajan* , unknown grass, sweeping grass, flower of everlasting, on flowers of numerous leguminous plants

Megalurothrips typicus **Bagnall**
Megalurothrips typicus Bagnall, 1915: 590.
Holotype female, Malaysia: Mt. Matang, Sarawak, Borneo (TMNH)[examined]
Taeniothrips varicornis Moulton, 1936:267.

Diagnosis. Body dark brown. Head about as long as wide. Interocellar setae about 3 times as long as distance between their bases. Antennal segments I and II brown; III, basal half of IV and V yellow; apices of IV and V and VI to VIII light brown. All femora brownish. Forewings light yellowish brown, with distinct pale areas basally and subapically. Metascutum transversely reticulate. Abdominal tergite VIII with comb of microtrichia on posterior margin. Sternite VII with posteromarginal setae along posterior margin.

Female macroptera. Head about as long as wide; transversely striate posteriorly. Preocellar setae about as long as postoculars. Interocellar setae about 3 times as long as the distance between their bases. Antennal segments I and II brown; III, basal half of IV and V yellow; apices of IV and V and all of segments VI to VIII light brown; segment III shorter than IV, each with moderately long, forked sense cone. Mouthcone elongate, narrowly rounded.

Pronotum transversely striate; moderately setose. Femora and mid and hindtibiae brownish; foretibiae brownish basally, yellowish apically; all tarsi yellow. Forewings light yellowish brown, with distinct pale areas basally and subapically; anterior vein with 2 dark, distal setae; posterior fringe cilia wavy. Mesonotum transversely striate. Metascutum transversely reticulate on anterior half, faintly reticulate on posterior half; longitudinally striate laterally; median setae placed near anterior margin; campaniform sensilla present.

Abdominal tergite 1 transversely striate. Tergite VIII with comb of microtrichia on posterior margin; lateral setae reaching beyond middle of of tergite IX. Tergites IX and X subequal, distinctly longer than other tergites, each with apical setae longer than its segment; apical setae on tergite IX surpassing tip of X. Sternite VII with posteromarginal setae placed along posterior margin.

Male macroptera. Similar to female in structure. Abdominal tergite IX with B1 and B3 setae spine-like, B1 larger. Sternites without glandular areas.

Material examined. 1 female, Los Banos, [Laguna], on grass, 22-VI-1931, I. D. Dobrosky, (Moulton coll.); 1 male, Laguna, on legume, 20-X-1931, I. D. Dobrosky (Moulton Coll.) (**CASC**); 1 female, Tadlak, Los Banos, Laguna, on flower of "katuray", 5-XII-1984, C. R. Baltazar (**CPRC**).

Distribution (Fig. 41). The known range of this species extends from India eastward in the Indonesia Archipelago, to the Pacific Islands and in the United States. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: Los Banos, Laguna; Laguna. INDONESIA: Java; Krakatua; Sumatra, Timor. THAILAND. JAPAN. TAIWAN. GUAM. SAIPAN. INDIA. MALAYSIA: Borneo; Sarawak. PAPUA NEW GUINEA. SAMOA. FIJI. MARIANAS IS. U.S.A.: Utah.

Hosts. legume, grass, flower of "katuray", *Nicotiana tabacum, Mangifera indica, Persea gratissima, Luffa cylindrica, Tephrosia candida, Desmodium umbellatum, Leucaena glauca, Pongamia glabra*

Megalurothrips usitatus **(Bagnall)**
Physothrips usitatus Bagnall, 1913a: 293.
Holotype female, India: Allahabad (TMNH)[examined]
Taeniothrips longistylus Karny; Moulton, 1936: 267.

Diagnosis. Body dark brown. Head about as long as wide. Interocellar setae 2.5 to 3 times as long as distance between their bases. Antennae brown except segment III yellow. Forefemora yellowish; dark brown along outer margin. Forewings brownish with distinct subapical pale area. Metascutum transversely reticulate. Abdominal tergite VIII with complete comb of microtrichia on posterior margin. Sternite VII with posteromarginal setae anterior to posterior margin.

Female macroptera. Head about as long as wide, with transverse striae posteriorly. Preocellar setae longer than postoculars. Interocellar setae 2.5 to 3 times as long as distance between their bases. Postocular setae developed. Antennae brown except segment III yellow; segments III and IV each with forked sense cone. Mouthcone elongate, rounded.

Pronotum with transverse striae; moderately setose; anteroangular setae prominent; posteroangular setae subequal. Forefemora yellowish; dark brown along outer margins; foretibiae golden; mid and hindtibiae dark brown, with pale apices; tarsi yellow; hindtibiae with 2 pairs of spine-like setae on inner margin towards apex. Forewings brownish, with distinct subapical pale area; anterior vein with 2 strong, dark, distal setae; posterior fringe cilia wavy. Mesonotum with widely spaced transverse striae. Metascutum transversely reticulate; median setae at or near anterior margin; campaniform sensilla present.

Abdominal tergite 1 with transverse striae. Tergites II to VII smooth medially, striate laterally. Tergite VIII with comb of microtrichia on posterior margin. Tergite IX and X with long, dark, apical setae, pointed at apex. Sternite VII with median pair of posteromarginal setae anterior to posterior margin.

Male macroptera. Similar to female in structure. Antennae, pronotum and forelegs lighter in color. Abdominal sternites without glandular areas and accessory setae.

Material examined. 1 female, Laguna, on legume, 20-X-1931, I. D. Dobrosky (Moulton Coll.); 1 female, 2 males, 20-X-1931, I. D. Dobrosky (Moulton Coll.); 6 females, 2 males, Los Banos, Laguna, VII and VIII-1931, D. T. Fullaway (Moulton Coll.); 1 female, Cadiz, Viejo, Cadiz, Negros Occidental, 5-VI-1929, W. D. Pierce, (Moulton Coll.) (CASC); 9 females, 1 male, UPLB, Los Banos, Laguna, on *Phaseolus vulgaris*, II-VII-1982; 1 female, on *Vigna sesquipedalis*, 22-VII-1982; 1 female, on *Vigna* sp., 5-X-1982; 1 female, on *Luffa cylindrica*, 22-VII-1982; 1 female, on flower of *Phaseolus vulgaris*, 13-X-1983; 2 females, 3 males, 5-X-1983; 4 females, 3 males, on flower of *Vigna sinensis*, 5-X-1983; 1 female, on *Citrullus vulgaris*, 18-IX-1984, C. P. Reyes; 1 female, on *Momordica charantea*, 21-IX-1984; 3 females, 2 males, on *Vigna sinensis*, 22-IX-1984, E. Mituda; 2 females, on *Vigna sinensis*, 27-IX-1984, C. P. Reyes; 6 females, 2 males, UPLB, Los Banos, Laguna, on *Vigna sinensis*, 22-IX-1984, O. Estioko; 4 females, 2 males, on flower of *Phaseolus vulgaris*, 23-I-1985, Oratai and Chantana; 1 male, on unknown weed, 12-III-1985, Oratai and Chantana; 2 females, Putinglupa, Calamba, Laguna, on *Cajanus cajan*, 5-II-1983, C. P. Reyes; 1 female, Canlubang, Laguna, on *Solanum tuberosum*, 11-III-1988, E. C. Mituda; 6 females, 4 males, MSAC, La Trinidad, Mt. Province, on *Desmodium triflorum*, 8-XII-1984, C. P. Reyes; 3 females, MMSU, Batac, Ilocos Norte, on *Phaseolus lunatus*, 9-IV-1985, C. P. Reyes; 1 male, Wright Park, Baguio City, on flower of *Crepis japonica*, 8-VII-1984, C. P. Reyes; 10 females, Brooks Point, Palawan, on flower of *Kudzu*, 30-I-1985; 2 females, on *Moghania lineata*, 29-I-1985. C. P. Reyes; 1 female, BFD, Sabsaban, Brooks Point, Palawan, on flower of *Coffea arabica*, 29-I-1985, C. P. Reyes; 3 females, on *Vigna sinensis*, 31-I-1985, C. P. Reyes; 2 females, 3 males, PNAC, Palawan, on *Mimosa pudica*, 27-I-1985; 1 female, on *Andropogon citratus*, 26-I-1985, C. P. Reyes; 2 females, on *Kudzo* sp., 25-I-1985, C. P. Reyes; 16 females, 14 males, VISCA, Baybay, Leyte, 5-

V-1983, C. P. Reyes; 11 females, 5 males, VISCA, Baybay, Leyte, on *Phaseolus vulgaris*, 1-VIII-1988, E. C. Mituda; 1 female, Agroforestry demo farm, Mt. Pangasugan, Baybay, Leyte, on yellow pan trap, 20-IX-1983, A. Almeroda; 19 females, VISCA, Baybay, Leyte, on flower of *Phaseolus vulgaris*, 5-V-1983; 1 male, on *Saccharum spontaneum*, 13-V-198; 1 female, on leguminous weed, 6-V-1983, C. P. Reyes; 1 female, on *Amaranthus spinosus* flower, 14-VI-1985, C. P. Reyes; 1 female, on *Phaseolus lathyroides*, 2-VII-1984, A. Almeroda; 2 females, CMU Campus, Musuan, Bukidnon, 22-VII-1988, E. C. Mituda; 3 females, Mlang, North Cotabato, on *Cucurbita maxima*, 17 and 18-II-1985; 6 females, on *Sida rhombifolia*, *Sandoricum koetjape*, *Hibiscus* sp., *Conchorus olitorius*, *Crotolaria mucronata*,17-II-1985; 2 females, on *Cajanus cajan* and *Momordica charantea*, 18-II-1985; 2 females, on *Saccharum officinarum*, 18-II-1985; 4 females, on *Glycine max*, 18-II-1985; 3 females, on *Centrosema pubescens*, 18-II-1985; 3 females, on *Luffa cylindrica*, 17-II-1985; 8 females, on *Centrosema pubescens*, 17-II-1985, C. P. Reyes; 2 females, 1 male, Malandag, Malungon, South Cotabato, on *Ipomoea batatas*, 25-II-1985; 3 females, on *Alysicarpus vaginalis*, 23-II-1985, C. P. Reyes; 1 female, on winged bean flower, 25-II-1985, C. P. Reyes; 1 female, Agko, Mt. Apo, unknown, 5-V-1987, C. P. Reyes; 2 females, Tugbok, Davao City, on *Dolichos lablab*, 4-III-1985, C. P. Reyes (**CPRC**).

Distribution (Fig. 41). The known range of this species extends from India eastward in the Indo-Australian Archipelago, to the Pacific Islands. In the Philippine Archipelago, this species is known form the four principal zoogeographic regions, on the islands of Luzon, Palawan, Visayas and Mindanao. PHILIPPINES: Luzon; Palawan; Visayas; Mindanao. JAPAN. TAIWAN. CHINA. VIETNAM. CAMBODIA. THAILAND. INDONESIA: Krakatua; Java; Sumatra. MALAYSIA. INDIA. NEPAL. SRI LANKA. PAKISTAN. BANGLADESH. HONGKONG. PONAPE ISLAND. PAPUA NEW GUINEA. AUSTRALIA. FIJI. SAMOA. SOCIETY IS. NEW HEBRIDES. KIRIBATI. ELLICE IS. VERLATIN IS. TONGA.

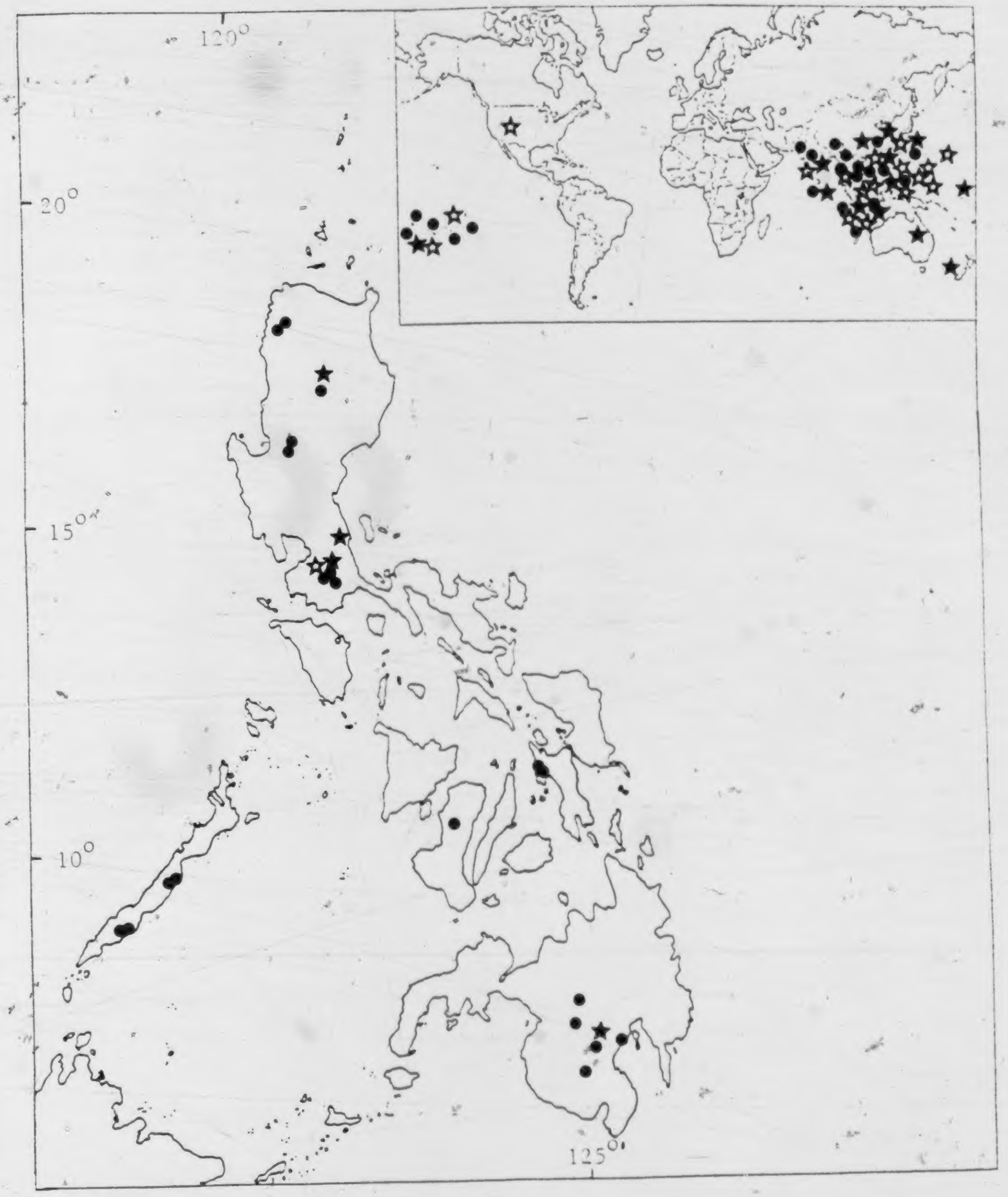
Hosts. This species is very common in the Philippine Islands associated with various flowering plants especially of family Leguminosae.

Fig. 41. Distribution of *Megalurothrips* species in the Philippines, and world.

★ *M. distalis* Karny

☆ *M. typicus* Bagnall

● *M. usitatus* (Bagnall)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Genus *Microcephalothrips* Bagnall

Microcephalothrips Bagnall, 1926: 113.
Type species: *Thrips abdominalis* Crawford, by original designation and monotypy.

Diagnosis. Head small, slightly wider than long. Ocelli fairly far apart. Ocellar setae pair I absent. Interocellar and postocular setae small. Eyes proportionately large. Antennae 7- segmented; segments III and IV each with forked sense cone. Maxillary palpi 3- segmented. Mouthcone moderately developed.

Pronotum with small setae; posteroangular pair small but slightly longer than the others; posteromarginal setae inner to angulars 5 or 6 pairs. Tarsi 2- segmented. Forewings bowed; anterior vein with setae interrupted; posterior vein uniformly set with setae; posterior fringe cilia wavy. Mesosternal spinula present. Metasternal spinula absent.

Most abdominal tergites with craspeda of scallop-like projections on posterior margins. Median pair of setae on intermediate tergites placed far apart. Tergite X almost completely divided longitudinally. Males with glandular area on each of sternites III-VII; without thorn-like setae on tergite IX. Sternites with accessory setae.

Microcephalothrips is a monobasic genus closely related to *Thrips*. Adults of *M. abdominalis* are distinguished from those of the genus *Thrips* by the following characters: head much smaller than prothorax, and most abdominal tergites with craspedum of scallop-like projections along posterior margins.

Microcephalothrips abdominalis **(Crawford, D.L.)**
Thrips abdominalis Crawford, D.L. 1910: 157.
Syntype females, Mexico: Guadalajara (**CNIC**) [not examined]
Microcephalothrips abdominalis (Crawford, D.L.); Moulton, 1936: 272.

Diagnosis. Body brown. Head small. Interocellar setae placed outside ocellar triangle. Antennae brown. Pronotum with posteroangular setae slightly longer than posteromarginals. Legs moderately stout, predominantly brown. Forewings brown, curved forward at apex. Metascutum transversely reticulate on anterior median half. Abdominal tergites with posteromarginal craspeda of large, triangular teeth. Sternites with numerous accessory setae.

Female macroptera. Head unusually small, with widely spaced, transverse striae. Interocellar setae placed outside ocellar triangle. Postocular setae short. Antennae brown; segment III pale, pedicellate; III and IV each with a short, forked sense cone; VI about 1.8 times as long as segment V. Mouthcone short, broadly rounded.

Pronotum broad, rounded at posterior angles; posteroangular setae slightly longer than posteromarginals. Legs moderately stout, brown with pale tarsi. Forewings slender, brown, curved forward at apex; vein setae pale; anterior vein with 3 distal setae; posterior vein with 6 widely spaced setae. Mesonotum transversely striate. Metascutum transversely reticulate on anterior median half, longitudinally striate posteriorly and laterally; median setae placed behind anterior margin; campaniform sensilla present .

Abdominal tergites transversely striate, each with a posteromarginal craspedum of large, triangular teeth. Tergites V to VIII with a pair of ctenidia laterally; ctenidia on tergite VIII placed posterior to spiracle. Tergites IX and X with pale, developed apical setae, expanded at apex. Sternites with numerous accessory setae.

Male macroptera or microptera. Similar to female in general structure. Body smaller, paler in color. Abdominal sternites III to VII each with small, circular glandular area.

Material examined. Syntypes (9 females) , Guadalajara, Mexico, on *Solanum*.sp., D. L. Crawford. Others. 1 female, 1 male, Sta. Isabel, Negros Occidental, on *Lantana camara*, 11-IX-1928, W. D. Pierce; 4 females, Negros Occidental: Saravia; Bontod [Bacolod]; Victorias; Taytay, Bago, on *Poedesia tomentosa* and *Blumea* sp., IV and V-1929, W. D. Pierce, (Moulton Coll.) (**CASC**); 12 females, 3 males, UPLB, Los Banos, Laguna, on *Cosmos caudatus*, I-VIII-1982, C. P. Reyes; 2 females, on *Tagetes erecta*, 17-IX-1984, E. Mituda; 1 female, on flower of *Phaseolus vulgaris*, 23-I-1985, Oratai and Chantana; 10 females, on *Helianthus annuus*, 12-III-1985, Oratai and Chantana; 1 female, on *Wedelia trilobata*, 13-X-1983; 6 females, on *Ficus odorata*, 15-II-1981, M. Navasero; 1 female, on flowers of *Plumiera acutifolia*, 2-III-1985, Oratai and Chantana; 3 females, 2 males, host unknown, X-1982, C. P. Reyes; 1 female, Laguna, on *Chromolaena odorata*, 12-III-1985, C. P. Reyes; 3 females, Mt. Makiling, Laguna, on *Tridax procumbens*, 28-III-1974, V. P. Gapud; 4 females, IPB, UPLB, Los Banos, Laguna, on *Tridax procumbens*, 5-X-1983, C. P. Reyes; 6 females, IRRI, Los Banos, Laguna, on *Oryza sativa*, 7-VIII-1983, Kim; 1 female, on *Azolla* sp., 24-X-1983, I. Lit; 1 female, on *Borreria* sp., 4-X-1983, C. P. Reyes; 3 females, on flowers of *Wedelia trilobata*, 4-X-1983, C. P. Reyes; 1 female, National Botanical Garden, Real, Quezon, on *Plumiera acutifolia*, 2-III-1985, C. P. Reyes; 6 females, 1 male, Sta. Lucia, Mt. Banahaw, Quezon, on *Solanum tuberosum*, 14-III-1988, E. C. Mituda; 1 female, Wright Park, Baguio City, host unknown, 18-XII-1984, C. P. Reyes; 4 females, 1 male, Mt. Mayon, rest house, Albay, on flowers of unknown plant, 6-VI-1987, C. P. Reyes; 1 male, Bicol Expt. Sta., Pili, Camarines Sur, on flowers of Dona Aurora, 4-VI-1987, C. P. Reyes; 2 females, on young shoot of Araceae and flower of unknown shrub, 5-VI-1987, C. P. Reyes; 4 females, PNAC, Palawan, on *Ipomoea batatas*, 26-I-1985, C. P. Reyes; 1 female, on *Andropogon citratus*, 26-I-1985, C. P. Reyes; 2 females, PNAC, Palawan, D-VAC sample, 25-I-1985, S. G. Reyes; 17 females, on *Chromolaena odorata*, 25-I-1985, C. P. Reyes; 3 females, Tagdidili, Brooks Point, Palawan, on flower of *Tagetes erecta*, 30-I-

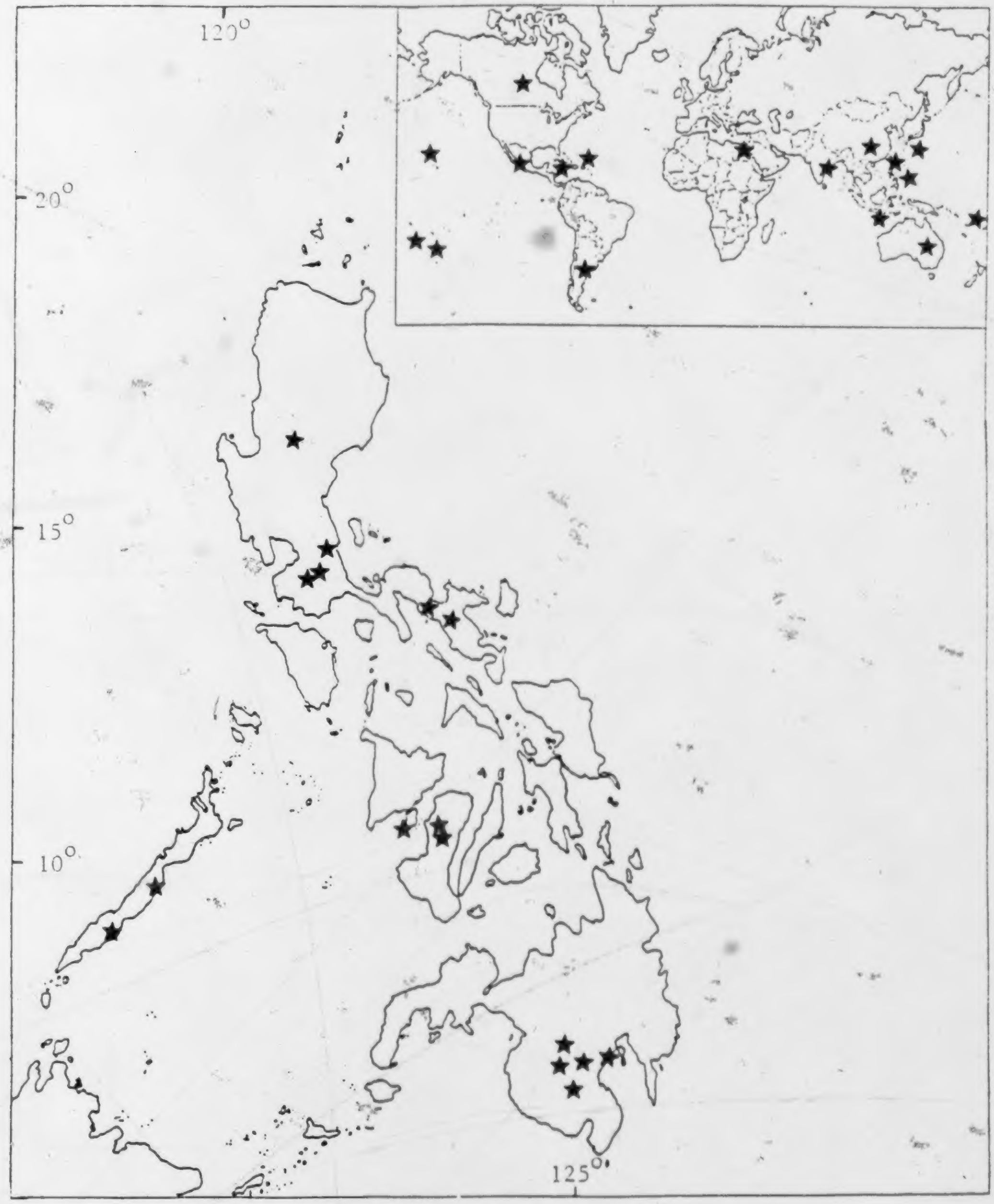
1985, C. P. Reyes; 14 females, 3 males, on leaves of *Bambusa* sp., 29-I-1985; 2 females, on *Tagetes erecta*, 30-I-1985, C. P. Reyes; 1 female, Brooks Point, Palawan, on *Polygonum barbatum*, 30-I-1985; 1 female, on flower of *Kudzu* sp., 30-I-1985, C. P. Reyes; 1 female, VISCA, Baybay, Leyte, on *Stylosanthes* sp., 13-V-1987; 9 females, on Compositae, 5-V-1983, C. P. Reyes; 5 females, Mambucal, Murcia, Negros Occidental, on flower of *Blumea*, 13-II-1985, C. P. Reyes; 1 female, La Granja, La Carlota, Negros Occidental, on flower of *Acalypha*, 15-V-1985, C. P. Reyes; 1 female, La Granja, La Carlota, Negros Occidental, on *Vigna sinensis*, 26-V-1987, C. P. Reyes; 3 females, Guimaras Expt. Sta., Jordan, Guimaras, on *Chrysanthemum* sp., 22-V-1987, C. P. Reyes; 1 female, Pina, Guimaras, on *Lycopersicum lycopersicon*, 22-V-1987, C. P. Reyes; 4 females, Mlang, North Cotabato, on flower of margarita, 10-V-1987; 3 females, on flowers of *Luffa cylindrica*, 17-II-1985; 3 females, 1 male, on flower of *Hibiscus*, 13-II-1985; 2 females, on *Lagerstroemia speciosa*, 19-IV-1983; 1 female, on "alibhon"leaf, 17-II-1985; 1 female, on *Vernonia cinerea* flower, 18-II-1985; 1 female, on flowers of *Chromolaena odorata* and *Gardenia* sp., 17-II-1985; 1 female, on flower of *Gardenia* sp., 27-II-1985; 4 females, 27-II-1985, on *Sida rhombifolia*; 1 female, on *Tridax* sp., 18-II-1985, C. P. Reyes; 1 female, Malasila, Tulunan, North Cotabato, on flower of Fabaceae, 23-IV-1983, C. P. Reyes; 2 females, Malungon, South Cotabato, on *Ageratum conyzoides* and host unknown, 23-II-1985, C. P. Reyes; 1 female, on flower of *Normanbya merrilli*, 1 female, unknown, 3 females, on "bleeding heart", 24-II-1985, C. P. Reyes; 1 female, on *Ippomoea batatas*, 4 females on *Ipomoea aquatica*, and 2 females, on *Heliotropium indicum*, Malandag, Malungon, South Cotabato, 25-II-1985, C. P. Reyes; 2 females, Agko, Mt. Apo, on flowers of unknown plant, 5-V-1987; 1 female, on flower of everlasting, 4-V-1987; 3 females, on African daisy, *Crinium asiaticum*, and flowers of *Cosmos caudatus*, 16-IV-1983, C. P. Reyes; 1 female, USM, Kabacan, North Cotabato, on *Vernonia cinerea* flower, 18-II-1985, C. P. Reyes; 1 female, Bago-Oshiro, Davao City, host unknown, 31-V-1984, S. G. Reyes (**CPRC**).

Distribution (Fig. 42). Stannard (1968) suggested that *M. abdominalis* is a new world species which has been transported elsewhere by man. In the Philippine Archipelago, this species is known from the four principal zoogeographic regions, on the islands of Luzon, Palawan, Visayas and Mindanao. PHILIPPINES: Luzon; Palawan; Visayas; Mindanao. INDONESIA. INDIA. BANGLADESH. TAIWAN. CHINA. JAPAN. AUSTRALIA. FIJI. SOLOMON IS. PALAU. GUAM. EGYPT. U.S.A; Hawaii Is.; Georgia; Oklahoma; Florida; Virginia; Texas; Maryland; Kansas; Illinois; Colorado; Iowa; Washington; South Carolina; North Carolina; New Jersey; New York; Alabama; Colorado; Louisiana; Mississippi; Indiana; Utah; Arizona. CANADA. MEXICO. CUBA. PUERTO RICO. ARGENTINA.

Hosts. This species is common in the Philippine islands on various flowering plants particularly with composite flowers.

Fig. 42. Distribution of *Microcephalothrips abdominalis* (Crawford, D. L.) in the Philippines, and world.

★ *M. abdominalis* (Crawford, D. L.)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Genus *Neohydatothrips* John

Neohydatothrips John, 1929: 33-34.
Type species: *Neohydatothrips latereostriatus* John by original designation and monotypy.

Diagnosis. Head wider than long; postoccipital apodeme situated variously, marking off a wide, crescentic postocciput. Antennae 8-segmented, with forked sense cone on each of segments III and IV; segment II without dorsal seta basad campaniform sensillum; major sense cones on segments V to VII inserted on elongate bases. Mouthcone moderately long to short, conical.

Pronotum with well defined blotch area. Mesosternal spinula present. Metasternum with transverse line behind anterior margin, line medially with or without T-shaped apodeme. Metascutum and scutellum partially or completely divided.

Abdominal tergites II to VII with median setae not similarly placed and not of similar size, on II to IV closer together, with length increasing gradually from anterior to posterior tergites. Sternites III to VII usually with 3 pairs of setae, inserted marginally, those on VII of female usually positioned anterior of posterior margin.

Neohydatothrips includes 16 species (Bhatti, 1973). zur Strassen (1980b) revised the western Palearctic species of *Neohydatothrips*. A new species, *N. calilungae*, is described below from the Philippines.

***Neohydatothrips calilungae*, n. sp.**
Holotype male, Philippines: Visayas: Baybay, Leyte (**UPLB**)
Figure 43a, b, c, d, e, f

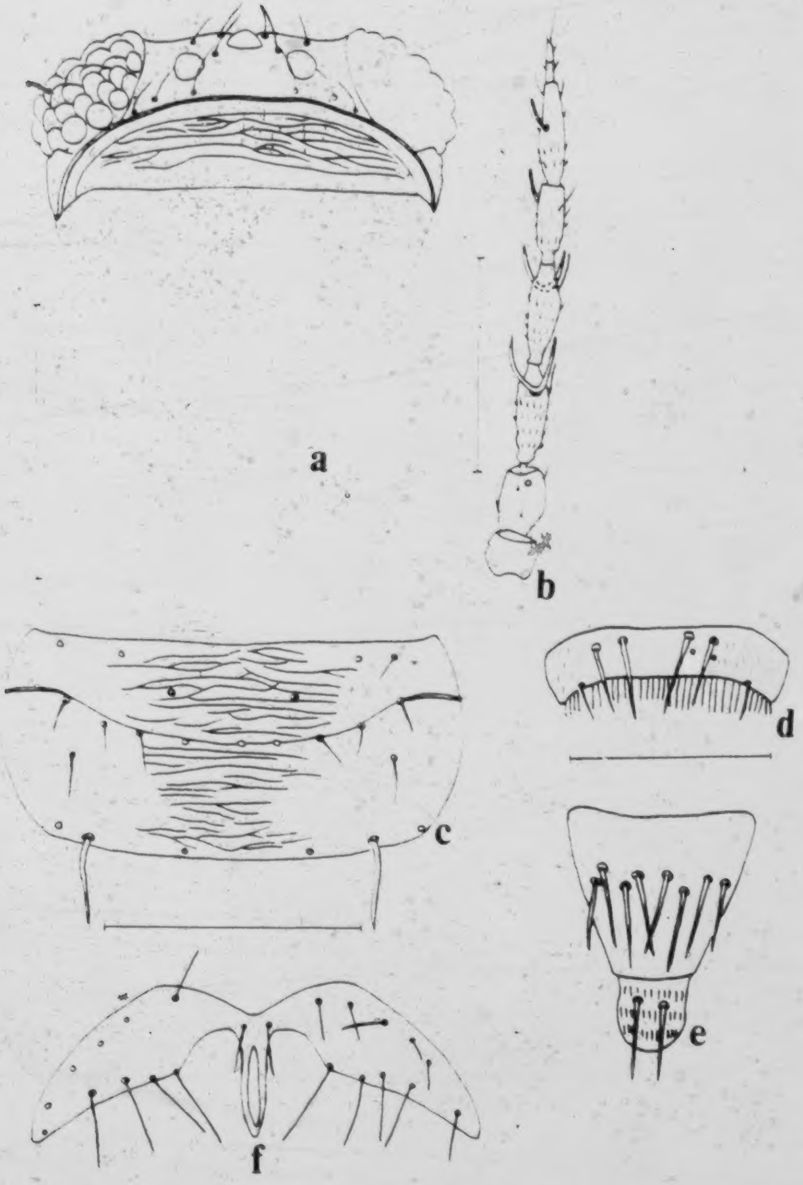
Diagnosis. Body bicolored. Head yellowish with shade of brown anterior to apodeme; thorax pale; abdominal tergites I to VII yellowish white; tergites VIII to IX brown; tergite X light brown. Postoccipital apodeme of head close to row of postocular setae. Antennal segments I and II white; segments III and IV each with forked sense cone. Pronotal blotch placed anterior to transverse apodeme across middle. Legs yellow. Forewings brown on apical two-third, with pale base. Abdominal tergites II to VIII with comb of microtrichia on posterior margin. Lateral microtrichia field on tergites II to VIII with 3 discal setae.

Adults of this species belongs to the *N. gracilicornis* section of *Neohydatothrips* in having a postoccipital apodeme close to the row of postocular setae. This species differs from *N. gracilicornis* (Williams), the only other species included in this section, in having a bicolored yellow and brown body, by the shape and color of antennal segments, and by forewing chaetotaxy.

Male macroptera. Head wider than long, brownish anterior of apodeme; postoccipital apodeme close to row of postocular setae (Fig. 43a). Ocellar setae developed. Eyes large. Antennal segments I and II whitish; III and IV yellowish; IV shaded with light brown apically; V to VIII brownish; segments III and IV each with forked sense cone (Fig. 43b). Mouthcone elongate rounded (Fig. 43a).

Pronotum with transverse apodeme and rows of setae across middle; surface with transverse anastomosed striae; pronotal blotch, positioned posterior to apodeme; posteroangular setae developed (Fig. 43c). Legs yellowish, elongate; hindlegs longest. Forewings shaded with brown on apical two-thirds, base pale; apical seta pale, long; microtrichia developed. Metasternum with a T-shaped apodeme (Fig. 43d).

Fig. 43. *Neohydatothrips calilungae*, n. sp., male holotype. a. Head b. Left antenna c. Pronotum d. Abdominal tergite VIII e. Abdominal tergites IX to X f. Metasternum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Abdominal tergites I to VII yellowish white; tergites VIII to IX brown; X light brown (Fig. 43f). Tergites II to VIII with comb of microtrichia on posterior margin; comb of microtrichia on posterior margin of tergite VIII longest (Fig. 43e); lateral microtrichial field with 3 discal setae.

Dimensions (holotype male; um). Body length (extended) 822.8. Head length 47.6, median width 137.7; interocellar setae length 15.3; postocular setae length 17.0; dorsal eye length 37.4; antennal segments length I 20.4; II 28.9; III 52.7; IV 44.2; V 34; VI 35.7; VII 8.5; VIII 10.2. Pronotum length 83.3, median width 80.2, major setae: pa 34. Tergite IX setae: B1 51, B2 49.3.

Type data. **Holotype** male, PHILIPPINES: Visayas: Baybay, Leyte, on leaves of *Codiaeum variegatum*, 13-V-1987, C. P. Reyes (**UPLB**). Paratype (1 male) same data as holotype (**UPLB**).

Female. Unknown.

Material examined. Type series only (**UPLB**).

Etymology. This species is named after an aphid systematist and the present director of UPLB Museum of Natural History, Dr. Venus J. Calilung, who provided several specimens.

Distribution (Fig. 44). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Baybay, Leyte.

Host. leaves of *Codiaeum variegatum*

Genus *Plesiothrips* Hood

Plesiothrips Hood, 1915b: 128.
Type species: *Sericothrips perplexa* Beach, by original designation and monotypy.

Diagnosis. Head about as long as wide or longer, prolonged in front of eyes. Ocellar setae pair I absent; interocellar setae developed. Inner pair of postocular setae inside or outside ocellar triangle. Antennae 7- or 8 -segmented; segment III small; III and IV each with forked sense cone; IV-VI greatly elongate in male. Maxillary palpi 3 -segmented. Mouthcone moderately long, rounded at tip.

Pronotum almost as long as wide; posteroangular setae well developed. Forelegs slender; tarsi 2- segmented. Anterior vein of forewings with series of setae interrupted near apex, or complete; posterior fringe cilia wavy. Mesosternal spinula present. Metasternal spinula absent.

Abdominal tergites V-VII each with pair of rudimentary, lateral ctenidia, on VIII posteriad of spiracles. Tergite VIII with red, hypodermal spot, and various comb of microtrichia on posterior margin; lateral ctenidia absent. Tergite X completely divided longitudinally; female ovipositor degenerate. Sternites without accessory setae. Sternites III and IV of males each with pair of small, circular, glandular areas; tergite IX with pair of thorn-like processes on posterior margin.

Adult females of *Plesiothrips* species can be easily distinguished from those of related genera by their degenerate ovipositors. Mound and Palmer (1981a) tentatively placed *Plesiothrips* in the *Thrips* genus-group due to presence of rudimentary ctenidia on abdominal tergites VI-VII. Twenty species are included in this genus, all from the new world except for *P. perplexus* which is widespread (Mound and Houston, 1987) and occurs in the Philippines.

***Plesiothrips perplexus* (Beach)**
Sericothrips perplexa Beach, 1896: 216.
Holotype female, U.S.A. : Ames, Iowa (?**Iowa**) [not examined]

Diagnosis. Body brown. Head about as long as wide. Interocellar setae inside ocellar triangle. Inner pair of postocular setae developed, placed medially. Antennae 7 or 8 segmented, predominantly brown except segment III yellow and IV yellowish brown. Legs bicolored. Forewings yellowish brown. Metascutum transversely reticulate medially. Abdominal tergites IX and X with long, pale apical setae each about 2 times as long as its segment. This is the first record of *P. perplexus* in the Philippines.

Female macroptera. Head about as long as wide; widest towards base; transversely striate posteriorly. Interocellar setae developed, inside ocellar triangle. Postocular setae with inner pair most developed, placed medially. Antennae about 2 times as long as head, predominantly brown; segment III yellow; IV yellowish brown; VI about 2.8 times as long as VII; segments III and IV each with forked sense cone. Mouthcone elongate, narrowly rounded.

Pronotum about as long as head; discal setae developed; posteroangular setae with outer pair longer than inner pair. Femora yellowish brown; tibiae and tarsi yellowish. Forewings yellowish brown, slender; veins with developed, pale setae; posterior fringe cilia wavy. Mesonotum smooth on anterior third, transversely reticulate on posterior two-thirds. Metascutum transversely reticulate medially; median setae placed behind anterior margin.

Abdominal tergites nearly smooth, with striae laterally. Tergites IX and X with long, pale apical setae, pointed at apex, each about 2 times as long as its segment. Sternites without accessory setae.

Male macroptera. Similar to female in color. Antennal segments IV to VI greatly elongate. Abdominal sternites III and IV each with pair of small, circular glandular areas. Not yet known in the Philippines.

Material examined. 1 female, Makiling Botanic Garden, Los Banos, Laguna, on unknown shrub, 4-VII-1987, C. P. Reyes (**CPRC**).

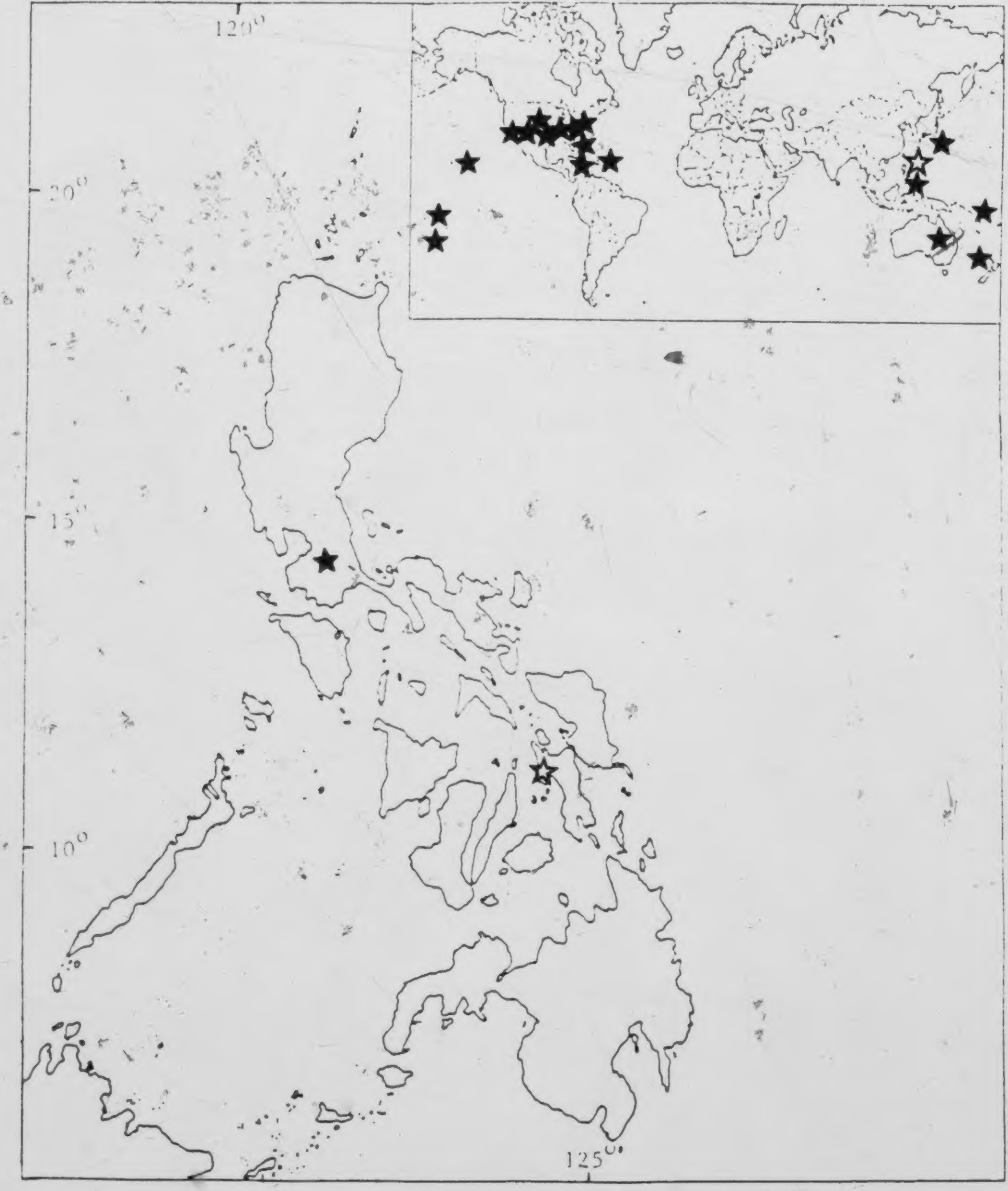
Distribution (Fig. 44). This species is widespread in the new world tropic, in the Pacific Islands to New Zealand. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: Makiling Botanic Garden, Los Banos, Laguna. JAPAN. NEW ZEALAND. FIJI. AUSTRALIA: Queensland. MARIANA IS. GUAM. SAMOA. SOLOMON IS. U.S.A.: Hawaii; Iowa; Massachusetts; Tennessee; Florida; Maryland; Washington D. C.; Illinois; Texas; Connecticut; South Georgia; Carolina; California; New Jersey. PUERTO RICO. CUBA.

Hosts. unknown shrub, various species of grass, on Cyperaceae, *Thea sinensis*

Fig. 44. Distribution of *Neohydatothrips calilungae*, n. sp. and *Plesiothrips perplexus* Beach in the Philippines, and world.

☆ *Neohydatothrips calilungae*, n. sp.

★ *Plesiothrips perplexus* Beach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Genus *Pseudodendrothrips* Schmutz
Pseudodendrothrips Schmutz, 1913: 992
Type species: *Pseudodendrothrips ornatissimus* Schmutz, by monotypy.

Diagnosis. Head wider than long. Ocelli positioned posteriorly; ocellar setae small, pair I absent. Eyes large and bulged. Postocular setae absent. Cheeks narrowed towards base, anterior margin concave between eyes; one pair of cheek setae developed. Antennae 8- to 9- segmented; segments III and IV each with forked sense cone; segment IV and apical segments gradually narrowed; inner sense cone of segment VI at base. Maxillary palpi 2- segmented. Mouthcone long, conical.

Pronotum much wider than long, transversely striate and with transverse apodeme at about middle; posteromarginal setae 4 pairs. Tarsi 1- segmented; hind tarsi longer than fore and mid tarsi; hindtibiae with 1 stout seta at inner apex. Forewings broad basally, pointed apically; costal setae long at base and apex; anterior fringe cilia arising from costal margin; posterior fringe hairs straight. Mesoscutum with transverse apodeme on anterior third; smooth in front of apodeme, transversely striate posterior to apodeme. Metathoracic furca lyre-shaped. Mesosternum with spinula. Metasternal spinula absent.

Abdomen transversely striate laterally, subdivided by longitudinal striae, and each with 6 pairs of tergal setae. Tergites II - VIII with B1 setae closely placed, gradually lengthened on posterior tergites. Posterior margin of tergite VIII with regular comb of microtrichia. Tergites IX and X with microtrichia on posterior half. Pleurotergites fused with tergites. Males without sternal glandular areas.

Adults of *Pseudodendrothrips* species are distinguished from those of *Dendrothrips* principally in having elongate hind tarsi and by their anterior fringe cilia arising from the costal margin of the forewings. This genus includes about 8 species (Kudo, 1984) of which only *P. mori* is known from the Philippines. A new species, *P. maculosus*, is described below.

Key to Philippine species of *Pseudodendrothrips* Schmutz

1. Forewings pale, unbanded, concolorous with body; head yellowish
.... *P. mori* (Niwa)

1'. Forewings shaded, with 2 brown, cross bands; head brownish
.... *P. maculosus*, n. sp.

***Pseudodendrothrips maculosus*, n.sp.**
Holotype female, Philippines: Luzon: Mudspring; Mt. Makiling (**UPLB**)
Figure 45a, b, c, d, e

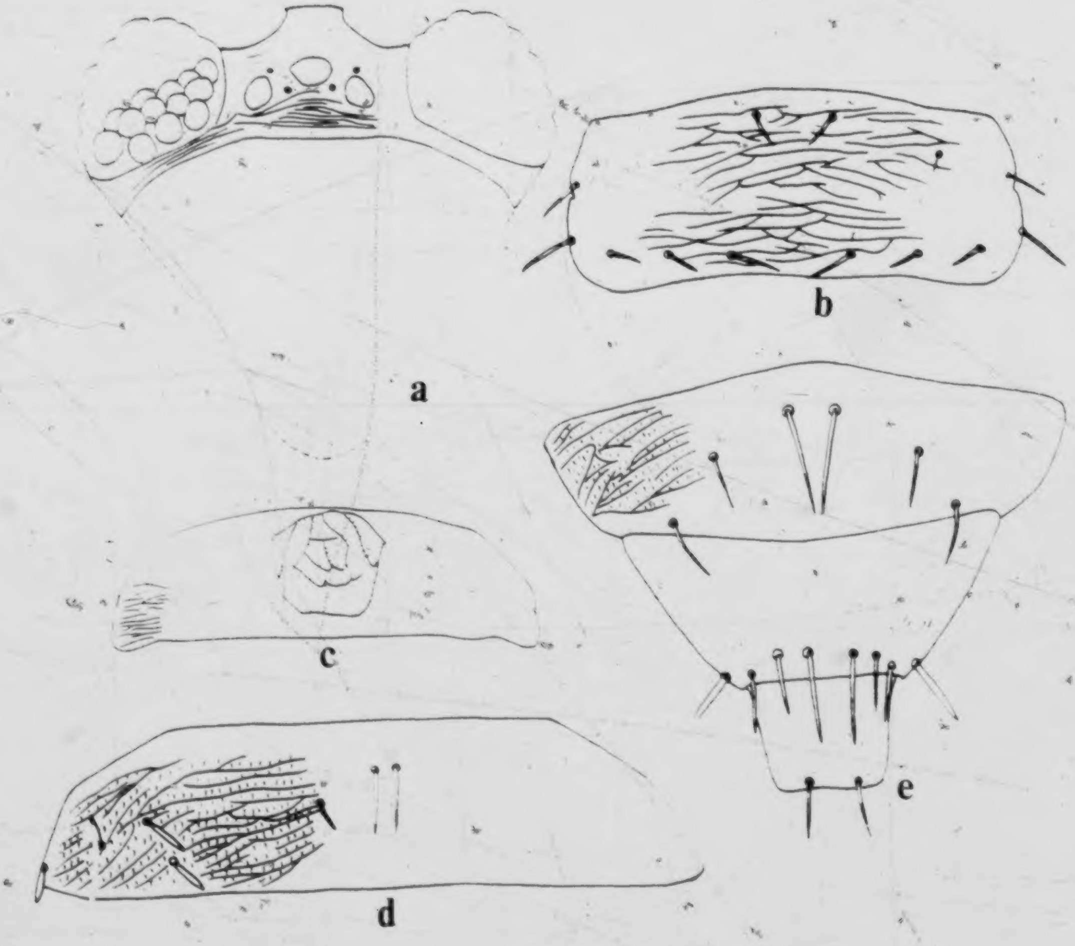
Diagnosis. Body bicolored. Head and thorax light brown; abdominal tergites II to VIII brownish laterally, yellowish medially; tergites IX and X brown. Major body setae lanceolate. Antennae brown; segments III and IV each with forked sense cone. Legs brown. Forewings with 2 brown, cross bands; base brown, apex pale. Abdominal tergite I reticulate medially; reticules with dot-like thickenings. Posterior half of tergite IX with microtrichia.

Members of this species differ from those of *P. mori* in having 2 brown cross bands on the forewings, a bicolored brown and yellow body, brown legs, and midlateral and posteroangular setae of pronotum and discal setae of abdominal tergites lanceolate.

Female macroptera. Head light brown, wider than long; with transverse, anastomosed striae (Fig. 45a). Interocellar setae small. Eyes large, more than one-half as long as head length. Cheeks smooth. Antennae brown; segments III and IV each with short, forked sense cone. Ventral surface of head with 4 stout setae. Mouthcone elongate, rounded (Fig. 45a).

Pronotum light brown, transversely reticulate; discal setae developed; midlateral and posteroangular setae nearly lanceolate (Fig. 45b). Legs brownish; tarsi pale; hindlegs elongate; hindtibiae without spine-like seta. Forewings with 2 brown, cross bands; base brown, apex pale; apical setae developed, curved and dark; anterior vein with minute setae; posterior fringe cilia straight. Mesonotum transversely reticulate with striae anastomosed medially on posterior half. Metascutum longitudinally striate medially, hexagonally reticulate laterally and posteriorly; median setae lanceolate. Metascutellum reticulate medially.

Fig. 45. *Pseudodendrothrips maculosus*, n. sp., female holotype. a. Head b. Pronotum c. Abdominal tergite I d. Abdominal tergite II e. Abdominal tergite VIII to X


a
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e

Abdominal tergite I reticulate medially; reticules with dot-like thickenings (Fig. 45c). Tergites II to VIII brownish laterally, yellowish medially; lateral area with transverse striae subdivided by fine lines and with 3 lanceolate setae ; median area smooth with slender setae (Fig. 45d). Posterior margin of tergite VII with sparse microtrichia medially. Posterior half of tergite IX with microtrichia; B1 setae longer than B2 setae; lateral setae lanceolate (Fig. 45e). Median apical setae of tergite X lanceolate.

Dimensions (holotype female; um). Body length (extended) 720.8. Head length 40.8, median width 146.2; dorsal eye length 39.1; antennal segments length: I 11.9; II 34; III 25.5; IV 23.8; V 22.1; VI 8.5; VII 17; VIII 11.9. Pronotum length 57.8; median width 153. Tergite IX setae: B1 32.3, B2 20.4.

Type data. **Holotype** female, PHILIPPINES: Luzon: Mudspring, Mt. Makiling, in litter, 27-VI-87, C. P. Reyes (**UPLB**).

Male. Unknown.

Material examined. Holotype female only (**UPLB**).

Etymology. Maculosus is a Latin word meaning "spotted" in reference to the forewings of these thrips which have cross bands.

Distribution (Fig. 46). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Mudspring, Mt. Makiling.

Host. All known members of *Pseudodendrothrips* are leaf feeders and most probably this species too although the single specimen was collected in litter.

Pseudodendrothrips mori **(Niwa)**
Belothrips mori Niwa, 1908: 180-181.
Holotype female, Japan(?**Lost**) [not examined]

Diagnosis. Body pale yellow. Head small; vertex slightly shaded with light brown; sculpture between eyes of irregular transverse striae. Antennal segments V and VI cylindrical. Pronotum transversely striate. Legs and forewings slender, yellowish. Mesonotum transversely striate anteriorly. Mesosternum with 18 to 21 setae. Metascutum longitudinally striate medially, hexagonally reticulate laterally. Abdominal tergites II to VII with transverse striae subdivided into fine lines laterally. Tergite IX with B1 setae stout, each borne on small tubercle. This is the first record of *P. mori* in the Philippines.

Female macroptera. Head small, wider than long, depressed anteriorly; sculpture between eyes of irregular striae. Ocelli placed posteriorly. Interocellar setae small, inside ocellar triangle. Antennae about 2.6 times as long as head and light or greyish brown; segments III and IV with forked sense cones; segments V and VI cylindrical; segment VII elongate, about 2 times as long as VIII. Mouthcone narrowly rounded.

Pronotum wider than long; sculpture of closely spaced, transversely anastomosed striae; discal setae small; posteroangular setae prominent, pointed at apex. Legs slender, yellow; foretibiae faintly shaded with light brown; hindlegs elongate; inner apex of hindtibiae with spine-like seta. Forewings and scale yellowish, slender; anterior vein setae few; posterior fringe cilia straight. Mesonotum with transverse striae anteriorly, posterior half with striae anastomosed medially. Mesosternum with 18 to 21 setae. Metascutum longitudinally striate medially, hexagonally reticulate posteriorly and laterally. Metascutellum smooth.

Abdominal tergites II to VII with transverse striae subdivided into fine lines laterally; smooth medially; median setae placed close together, gradually lengthened towards posterior tergites. Tergite VIII with comb of microtrichia on posterior margin. Tergite IX with B1 setae pale, stout, pointed at apex, each borne on small tubercle.

Male macroptera. Similar to female in structure. Vertex of head and foretibiae not shaded with brown. B1 setae of tergite IX slightly anterior to other setae. Abdominal sternites without glandular area (Stannard, 1968; Kudo, 1984). Not yet known in the Philippines.

Material examined. 20 females, UPLB, College, Laguna, on leaves of *Morus alba*, 28-VII-1987, V. J. Calilung (**CPRC**).

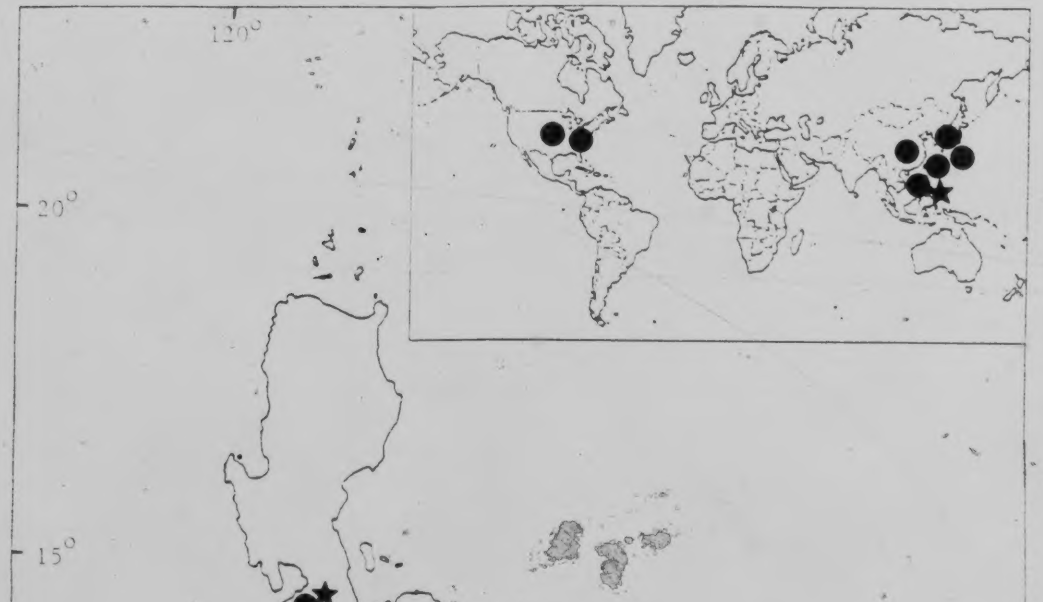
Distribution (Fig. 46). The known range of this species extends from China eastward in Korea and the Philippines and northward in the United States. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: College, Laguna. JAPAN. KOREA. CHINA. TAIWAN. U.S.A.: Maryland, Illinois.

Host. leaves of *Morus alba*

Fig. 46. Distribution of *Pseudodendrothrips* species in the Philippines, and world.

★ *P. maculosus*, n. sp.

● *P. mori* Niwa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20°
15°
10°
125°

Genus *Ranjana* Bhatti

Ranjana Bhatti, 1978b: 12.
Type species: *Euthrips cingulatus* Karny, by original designation.

Diagnosis. Head wider than long. Ocellar setae pair I absent. Postocular setae in row, none especially developed. Antennae 8- segmented; sense cones on antennal segments III and IV forked; microtrichia present on segments III-VI; median dorsal seta basad of campaniform sensillum on segment II. Maxillary palpi 3- segmented. Mouthcone short, rounded at apex.

Pronotum transverse, slightly wider than head; midlateral striae almost circular; setae not developed. Tarsi 2-segmented. Anterior vein of forewings with series of setae broadly interrupted; posterior vein usually with 4 setae; posterior fringe cilia wavy; apical seta about 5.6 - 6.0 times as long as preapical seta. Metascutum with characteristic transverse, median sculpture. Meso and metasternal spinulae present.

Abdominal tergites and sternites without continuous flanges on posterior margins. Posterior margins of tergites VII and VIII each with comb of very fine, closely packed, microtrichia medially. Sternite II with 2 pairs, III-VII with 3 pairs of posteromarginal setae. Sternal accessory setae absent. Tergite X completely divided longitudinally or only in apical two -thirds.

Adults of *Ranjana* resemble those of *Dichromothrips* Priesner in having meso and metasternal spinulae. Members of the former can be distinguished from those of the latter by having few posterior vein setae on the forewings, and by their pronotal sculpture which consists of circular midlateral striae. A single species is included in this genus, so far known only from the original collection of Docters van Leeuwen from Indonesia (Bhatti, 1978b) and in my collection from the Philippines.

Ranjana cingulata **(Karny)**
Euthrips cingulatus Karny, 1913b: 55-58.
Lectotype female, Indonesia: Moeriah Mountains, Java (**SMFG**) [examined]

Diagnosis. Body bicolored. Head wider than long, widest towards base. Interocellar setae minute. Antennae bicolored. Pronotum with sublateral striae in form of subcircular, concentric patterns; posteroangular setae reduced. Legs predominantly yellow. Forewings with 2 brown cross bands; extreme base and apex pale. Metascutum with characteristic transverse striae. Abdomen bicolored. Tergites II to VI with lateral sculpture of transverse striae bearing dentate microtrichia.

Specimens from the Philippines vary slightly from that of the lectotype female from Indonesia in the color of abdominal tergites. Abdominal tergites IV and VIII of Philippine specimens are completely brown while their tergites V, VI and VII are brown medially.

Female macroptera. Head wider than long, widest towards base, with transverse anastomosed striae posteriorly. Preocellar and interocellar setae minute. Postocular setae pair IV vestigial. Antennae about 2.5 times as long as head; segment I brown; II, basal third of III, basal half of IV, and V yellow; apical two-thirds of III, apical half of IV and VI to VIII greyish brown; III and IV each with a moderately long, forked sense cone; VI elongate. Mouthcone short, broadly rounded.

Pronotum covered with transverse anastomosing striae; sublateral striae forming subcircular concentric patterns; posteromarginal setae 5 pairs; inner pair shaded, stout; posteroangular setae reduced. Legs predominantly yellow; outer margins of forefemora brown medially; midfemora brown on basal two-thirds. Forewings with 2 brown cross bands; extreme base and apex pale; anterior vein with 6 or 7 basal and 3 distal setae; posterior vein with 3 to 4 setae; scale brown. Mesonotum with few transverse striae. Metascutum transversely reticulate in anterior two-thirds, posterior third with closely spaced, anastomosed striae characteristic of genus; median setae small, placed behind anterior margin.

Abdominal tergites I and II yellow; tergite III brown on anterior half, yellow on posterior half; IV to VII or VIII brownish, V to VI darker medially. Tergites II to VI with lateral sculpture of transverse striae with dentate microtrichia; median third smooth. All tergites with minute median setae. Tergites IX and X with developed, pale apical setae.

Male . Unknown.

Material examined. 2 females, Sipit Saburan, Puerto Gallera, Oriental Mindoro, on unknown tree, 19-VI-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 47). The known range of this species extends from the Philippines to the Indonesia Archipelago. In the Philippines, this species is known from the island of Visayas. PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro. INDONESIA: Java.

Hosts. unknown tree, [leaf] galls on *Planchonia valida*

Genus *Scirtothrips* Shull

Scirtothrips Shull, 1909: 222
Type species: *Scirtothrips ruthreni* Shull, by monotypy.

Diagnosis. Head wider than long, with relatively short setae. Ocellar setae pair I present. Antennae usually 8 -segmented; segments III and IV each with forked sense cone; segment VI sometimes pedicellate . Maxillary palpi 3-segmented. Mouthcone moderate in size.

Pronotum transversely striate, with blotch area; 1 pair of posteromarginal setae longer than the rest. Tarsi 2- segmented. Forewings narrow; anterior vein with interrupted setae; posterior vein only with apical setae; posterior fringe cilia wavy. Mesosternal spinula present. Metasternal spinula absent.

Abdominal tergites and sternites I-VIII with rows of microtrichia laterally, almost covering sternites. Tergites with median pair of setae closely spaced. Tergite VIII with complete comb of microtrichia on posterior margin. Sternites II-VII with major setae along posterior margin. Sternites without accessory setae. Males without glandular areas on sternites; tergite IX without thorn-like setae.

These are small thrips distinctive in having extensive areas of the abdomen covered by microtrichia. The 40 known species are widely distributed with 10 species known to be of economic importance (Mound and Palmer, 1981b). Two species of *Scirtothrips* , *S. dobroskyi* Moulton and *S. dorsalis* Hood are known from the Philippines.

Key to Philippine species of *Scirtothrips* Shull

1. Forewings uniformly light brown; abdominal tergites with transverse lines extended across segments; metanotum with reticulate sculpture medially; sternites without microtrichia medially...................... *S. dobroskyi* Moulton

1'. Forewings yellowish or pale grey; abdominal tergites with median transverse lines not extended across segments; metanotum with longitudinally elongate reticules or striae medially; sternites with 2 or more rows of microtrichia posteromedially... *S. dorsalis* Hood

***Scirtothrips dobroskyi* Moulton**
Scirtothrips dobroskyi Moulton, 1936:264.
Holotype female, Philippines: Manila (**CASC**) [examined]

Diagnosis. Body orange yellow. Head transversely striate; pale anteriorly. Interocellar setae in line with anterior margin of posterior ocelli. Antennal segment 1 pale; segments II to VIII brown. Pronotal posteromarginal setae pair II longest; pairs III and IV small. Legs yellow with faint markings. Abdominal tergite VIII without microtrichia medially. This species is known in the Philippines from the type material only.

Female macroptera. Head wider than long, pale anteriorly; vertex and posterior area with transverse striae. Interocellar setae placed in line with anterior margins of posterior ocelli. Postocular setae 2 pairs, placed medially. Antennal segment I pale; segments II to VIII brown; segments III and IV each with forked sense cone. Mouthcone elongate, rounded.

Pronotum with transverse striae; discal setae developed; posteromarginal setae 4 pairs; pair II longest; pair III and IV very small. Legs yellow with faint markings. Forewings light brown; anterior and posterior vein setae shaded; posterior fringe cilia straight. Mesonotum transversely striate.

Abdominal tergites pale, with dark antecostal ridge; lateral microtrichial fields with 3 pairs of discal setae. Tergite V with discal setae close together. Tergite VIII without microtrichia medially. Tergite IX with numerous microtrichia posteromedially. Sternites without microtrichia medially, numerous laterally.

Male macroptera. Similar to female in color and structure but smaller in size. Abdominal tergite IX with horn-like processes medially.

Material examined. Holotype female, PHILIPPINES: Luzon: Manila, on tomato plant, 2-VII- 1931, I. D. Dobrosky (Moulton Coll.) (**CASC**); **Paratype** (1 male) Manila, on onion [crossed out], toma[to], 10-VI-1931, I. D. Dobrosky (**CASC**).

Distribution (Fig. 47). The known range of this species extends from the Philippine Archipelago to Australia. In the Philippines, this species is known from the island of Luzon. PHILIPPINES: Luzon: Manila. AUSTRALIA.

Host. tomato plant.

Scirtothrips dorsalis **Hood**
Scirtothrips dorsalis Hood, 1919b: 90.
Holotype female, India: Coimbatore (USNM) [examined]
Scirtothrips dorsalis Hood; zur Strassen, 1980a: 200.

Diagnosis. Body yellow. Head transversely striate. Interocellar setae close together inside ocellar triangle. Antennal segments I, II, basal half of III, IV, and V pale; segments VI to VIII brownish. Pronotal posteromarginal setae pair no. II short. Legs yellowish. Abdominal tergite VIII and IX with microtrichia medially.

Female macroptera. Head wider than long; transversely striate. Interocellar setae close together, inside ocellar triangle. Postocular setae 2 pairs, inserted medially. Antennal segments I, II, basal half of III, IV and V pale; segments VI, VII and VIII brownish; segments III and IV each with forked sense cone; segment VI longer than segments VII and VIII combined. Mouthcone elongate, rounded.

Pronotum transversely striate; discal setae developed; posteromarginal setae 4 pairs; pair II short. Legs yellowish. Forewings brownish; anterior and posterior vein setae shaded; posterior fringe of cilia straight. Mesonotum transversely striate.

Abdominal tergites and sternites with dark antecostal ridge. Tergites with median dark patch; lateral microtrichial field with 3 pairs of discal setae. Tergites VIII and IX with microtrichia medially. Sternites with more than 2 rows of microtrichia posteromedially joining lateral microtrichial fields.

Male macroptera. Similar to female in color and structure. Tergite IX without horn-like processes medially.

Material examined. 2 females, UPLB, Los Banos, Laguna, on *Leucaena leucocephala*, 18-V-1987, C. P. Reyes; 3 females, UPLB, Los Banos, Laguna, on leaves of *Arachis hypogea*, 17-VIII-1987, C. Medina; 1 female, UPLB, Los Banos, Laguna, on *Capsicum annum*, 14-IX-1984, C. P. Reyes; 8 females, Bicol Expt. Sta., Pili, Camarines Sur, on *Macaranga* sp., 5-VI-1987, C. P. Reyes; 6 females, Bicol Expt. Sta., Pili, Camarines Sur, on young shoot of Araceae, 5-VI-1987, C. P. Reyes; 2 females, San Carlos City, on *Capsicum annum*, 4-VIII-1987, M. Alba; 95 females (only 2 mounted on slides), Guimaras Expt. Sta., Jordan, Guimaras, on leaves and flowers of *Mangifera indica* , 22-V-1987, C. P. Reyes; 1 female, Guimaras Expt. Sta., Jordan, Guimaras, on leaves of *Anacardium occidentale*, 22-IV-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 47). The known range of this species extends from South Africa eastward in the Indo-Australian Archipelago, to the Solomon Islands. In the Philippine Archipelago, this species is known from the islands of Luzon and Visayas. PHILIPPINES: Luzon: UPLB, Los Banos, Laguna; Ilocos Sur; Bicol Expt. Sta., Pili, Camarines Sur; Visayas: San Carlos City, Negros Oriental; Guimaras Expt. Sta., Jordan, Guimaras. INDONESIA: Java; Bali; Sumatra. MALAYSIA. THAILAND. SOUTH KOREA. PAKISTAN. BANGLADESH. INDIA. SRI LANKA. TAIWAN. HONGKONG. CHINA. JAPAN. AUSTRALIA: Queensland. PAPUA NEW GUINEA. SOLOMON IS. SOUTH AFRICA.

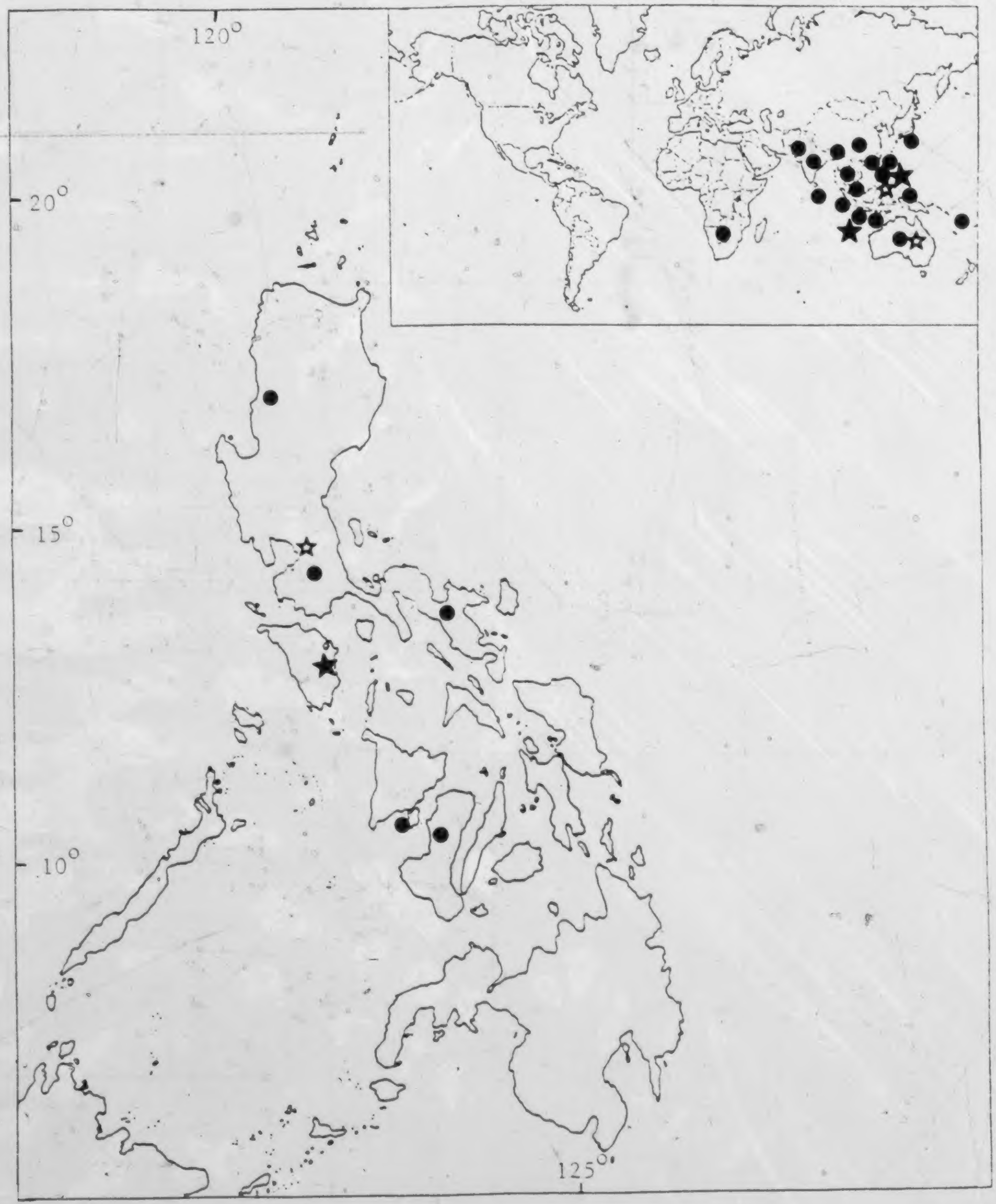
Hosts. *Leucaena leucocephala*, leaves of *Arachis hypogea, Capsicum annum, Macaranga* sp., young shoot of Araceae, leaves and flowers of *Mangifera indica*, leaves of *Anacardium occidentale*, gogu, *Cassia fistula*, brinjal, *Cassia* sp., tea plant, wood apple, *Nicotiana tabacum, Gossypium* sp., *Punica granatum*, violet, rubber, *Caesalpinia pulcherrima*, mulberry, *Acacia arabica, Prosopis spicigera, Ricinus communis, Azadirachta indica, Mimosa pudica, Nelumbium* sp., *Fagopyrum esculentum, Rosa* sp., *Thea sinensis, Cissus japonicus, Diospyros kaki, Dahlia pinnata, Vitis vinifera*, on numerous plants. *S. dorsalis* is a highly polyphagous thrips (Mound and Palmer, 1981). Adults and larvae of *S. dorsalis* were found in abundance on mango leaves and flowers during the summer of 1987 at Guimaras Experiment Station. In India, *S. dorsalis* is known as "chillies thrips" and is considered as a serious pest of chillies, tea and castor (Ananthakrishnan, 1973). According to Ananthakrishnan, infested plants turn brown to black and in extreme cases especially on drier months, become totally deformed and defoliated.

Fig. 47. Distribution of *Ranjana cingulata* (Karny) and *Scirtothrips* species in the Philippines, and world.

★ *Ranjana cingulata* (Karny)

☆ *Scirtothrips dobroskyi* Moulton

● *Scirtothrips dorsalis* Hood


120°
20°
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Genus *Stenchaetothrips* Bagnall

Stenchaetothrips Bagnall, 1926: 107.
Type species: *Stenchaetothrips melanurus* Bagnall, by original designation and monotypy.

Diagnosis. Head wider than long. Ocellar setae pair I absent; II longer than interocellars or pair III. Postocular setae either uniserial or biserial with pair II inserted behind pair III; postocular setae I and III usually strongly developed; I absent in few taxa. Antennae 7-segmented, with forked sense cones on each of segments III and IV; segment II with mid-dorsal seta basad of campaniform sensillum. Maxillary palpi 3- segmented, rarely 2-segmented.

Pronotum transverse, with 3 pairs of posteromarginal setae mesad major posteroangulars, 4 pairs in few taxa; some of the anteromarginals and lateral setae especially developed; posteroangular setae developed. Tarsi 2- segmented; hindtibiae without especially long setae on outer margins. Series of setae on anterior vein of forewings broadly interrupted in most species; posterior vein with numerous setae; posterior fringe cilia wavy. Median pair of mesonotal setae inserted far ahead of posterior margin. Metascutum longitudinally striate. Meso and metasternal spinulae absent, present on mesosternum in few taxa.

Abdominal tergites V to VIII with lateral ctenidia. Seta S4 reduced on tergites VI to VIII. Tergite VIII with varied comb of microtrichia on posterior margin. Tergite X completely divided. Tergites and sternites each with or without teeth on posterior margin; when present, not developed and irregular. Males with oval or transverse glandular area on each of sternites III to VII.

Adults of *Stenchaetothrips* species differ from those of *Thrips* by having preocellar setae longer than the interocellars and postocular setae not arranged in one row. Twenty species are known in this genus (Bhatti, 1980c, 1982). *S. biformis* and *S. minutus* are known from the Philippines and two new species are described below.

Key to Philippine species of *Stenchaetothrips* Bagnall

1. Posterior margins of abdominal tergites VI and VII without or with dentate microtrichia 2

1' Posterior margins of abdominal tergites VI and VII with developed, dentate microtrichia 3

2(1) Antennal segment VI yellow at base; mesosternal spinula absent .... *S. minutus* (van Deventer)

2' Antennal segment VI brown (Fig. 49d); mesosternal spinula present .... *S. spinalis*, n. sp.

3(1') Forewings uniformly dark greyish brown; posterior margins of abdominal sterna with small irregular teeth; body brown .... *S. biformis* (Bagnall)

3' Forewings light brown (Fig. 48d); abdominal sterna without teeth; body bicolored .... *S. denticulatus*, n. sp.

***Stenchaetothrips biformis* (Bagnall)**
Bagnallia biformis Bagnall, 1913b: 237.
Baliothrips biformis (Bagnall); Jacot-Guillarmod, 1974: 701.
Holotype female, U. K.: West-on-the-Green, England (**TMNH**)[examined]
Thrips oryzae Williams; Capco, 1957: 9

Diagnosis. Body dark brown or bicolored (Europe). Head wider than long; vertex with longitudinal row of 3 to 4 dark tubercles medially. Interocellar setae developed, inside ocellar triangle. Postocular setae pair I present or absent. Antennae predominantly brown. Legs bicolored. Forewings uniformly greyish brown. Metascutum with campaniform sensilla present or absent. Abdominal sternites with small irregular teeth.

Female macroptera. Head wider than long; transversely striate posteriorly. Vertex with longitudinal row of 3 to 4 dark tubercles medially. Interocellar setae developed, inside ocellar triangle. Postocular setae pair 1 absent but present in British specimens. Antennae predominantly brown; apex of segment II, segment III and base of segment IV pale. Mouthcone elongate, broadly rounded.

Pronotum rounded on posterior angles, with transverse striae; sparsely or densely setose; posteromarginal setae mesad angulars usually 3 pairs, 4 pairs in few taxa; posteroangular setae subequal. Forefemora and all tibiae yellowish brown; mid and hindfemora brown; all tarsi yellowish; hindtibiae with spine-like setae apically. Forewings uniformly greyish brown; anterior vein with 7 basal and 3 distal setae (rarely 2 or 4); posterior vein with 13 setae; posterior fringe cilia wavy; scale brown. Mesonotum with few transverse striae. Metascutum transversely striate on anterior quarter, longitudinally striate on posterior three quarters; median setae behind anterior margin; campaniform sensilla present or absent.

Abdominal tergites VI and VII with well developed dentate microtrichia. Tergite VIII with fine comb of microtrichia on posterior margin. Tergites IX and X with developed, dark apical setae, pointed at apex. Sternites with small irregular teeth. Sternites V and VI with or without small, glandular-like areas.

Male macroptera. Similar to female in structure and color. Posterior margin of abdominal tergites II to VII with prominent, laterally directed, pointed teeth on each side (Bhatti, 1982).

Material examined. 9 females, IRRI, Los Banos, Laguna, on *Oryza sativa*, 5-VII-1983, C. P. Reyes; 1 female, Wright Park, Baguio City, on *Rosa* sp., 8-XII-1984, C. P. Reyes; 1 female, Sipit Saburan, Puerto Gallera, Oriental Mindoro, on Rubiaceae, 20-VI-1987, C. P. Reyes (**CPRC**); 2 females, Alicia, Isabela, on *Oryza sativa*, 18-XI-1978, A. Barrion (**IRRI**).

Distribution (Fig. 50). The known range of this species extends from India eastward in the Indo-Australian Archipelago, and northward in Europe and South America. In the Philippine Archipelago, this species is known from Luzon and Visayas. PHILIPPINES: Luzon: Los Banos, Laguna; Wright Park, Baguio City; Alicia, Isabela; Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro. INDIA. PAKISTAN, NEPAL. SRI LANKA. BANGLADESH. MALAYSIA. THAILAND. CAMBODIA. VIETNAM. INDONESIA: Java, Sumatra. TAIWAN. JAPAN. CHINA. PAPUA NEW GUINEA. AUSTRALIA. U.K.: England. RUMANIA. BRAZIL.

Hosts. *S. biformis* is a pest of rice in the Philippines and in many oriental countries. Rice plants are susceptible to rice thrips during the seedling stage (Calora and Ferino, 1968). Due to the considerable damage caused by *S. biformis*, scientists at the International Rice Research Institute are developing control measures using varietal resistance (Nugaliyadde and Heinrichs, 1984). This species was also collected from the following: *Rosa* sp., Rubiaceae, *Phragmites communis*, *Phalaris arundinaceae*, *Nicotiana tabacum* field, grass, herb, sedge stacks, *Nicotiana tabacum*, *Zea mays*, *Agropyron semicostatum*, *Imperata cylindrica* var *Koenigii*, *Saccharum officinarum*, *Eleagnus* sp., *Agropyron tsukushiense*, *Alopecurus aequalis*, *Arundinella hirta*, *Digitaria adscendens*, *Echinochloa crusgalli*, *Eleusine indica*, *Eragrostis indica*, *Eragrostis ferruginea*, *Festuca parvigluma*, *Pennisetum alopecuroides*, *Phalaris arundinacea*, *Phragmites japonica*, *Shibataea kumasaca, Zoysia japonica* .

Stenchaetothrips denticulatus, n. sp.
Holotype female, Philippines: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro (UPLB)
Figure 48a, b, c, d

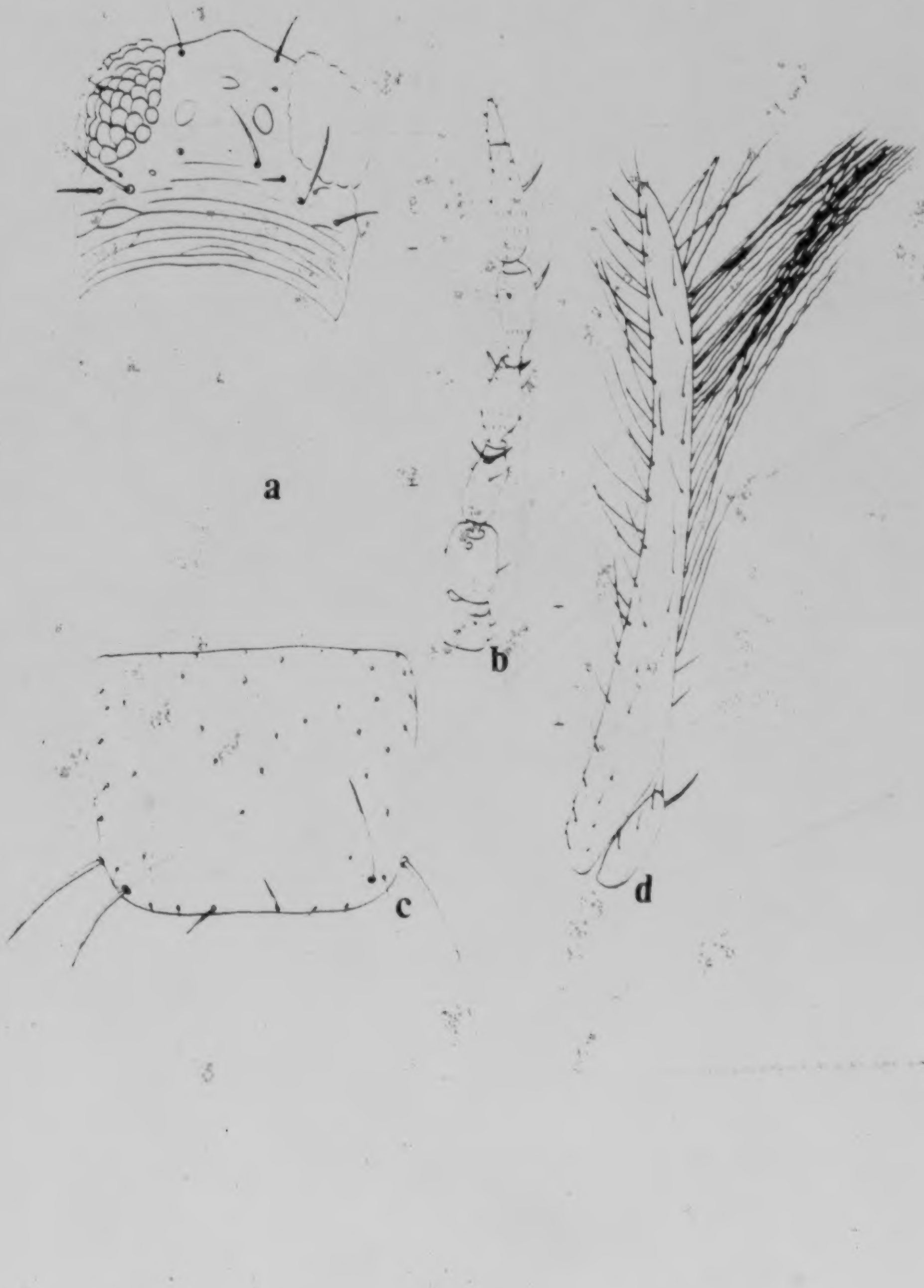
Diagnosis. Body bicolored. Head and thorax pale yellow; abdomen bicolored yellow and brown. Abdominal tergites I to V yellow; VI and VII yellow anteriorly, brown posteriorly; VIII brown, yellow medially; IX and X brown. Interocellar setae outside ocellar triangle. Antennal segments I to IV yellow. Pronotal posteromarginal setae mesad angulars, 3 pairs. Legs pale yellow. Forewings yellowish brown; anterior vein with 3 distal setae. Mesosternal spinula absent. Posterior margins of tergites V to VII with dentate microtrichia laterally; those on VIII complete.

Members of *S. denticulatus*, n.sp. are distinguished from those of the Indian species, *S. pteratus* Bhatti, in having uniformly yellowish brown forewings, posterior margin of abdominal tergites V- VIII with dentate microtrichia which are longer on VIII; and in the shape and length of antennal segments III and IV.

Female macroptera. Head pale yellow, wider than long; transversely striate posteriorly (Fig. 48a). Preocellar setae longer than interocellars. Interocellar setae well developed, placed outside ocellar triangle. Eyes more than one-third as long as head. Postocular setae pair I, III and V well developed; pair III longest. Antennae less than 2 times as long as head; segments I to IV yellowish; apex of segment V, apical two-thirds of VI and segment VII brown (Fig. 48b). Mouthcone elongate, rounded (Fig. 48a).

Pronotum pale yellow; major setae developed; posteromarginal setae mesad to angulars, 3 pairs; outer pair of posteroangular setae slightly longer than inner pair (Fig. 48c). Legs yellowish. Forewings uniformly yellowish brown; anterior vein with 7 basal and 3 distal setae; posterior vein with 8 or 9 setae; posterior fringe cilia wavy (Fig. 48d). Mesosternal spinula absent. Metascutum transversely striate anteriorly, longitudinally

Fig. 48. *Stenchaetothrips denticulatus*, n. sp., female holotype. a. Head b. Right antenna c. Pronotum d. Paratype female, forewing


a
b
c
d

striate on posterior two-thirds; median setae behind anterior margin; campaniform sensilla present.

Abdomen bicolored yellow and brown; tergites I to V pale yellow; VI to VII yellow on anterior half, brownish on posterior half; VIII yellow medially; IX and X brown. Posterior margins of tergites V to VII with dentate microtrichia. Posterior margin of tergite VIII with complete comb of developed, dentate microtrichia. B1 and B2 setae of tergites IX and X well developed. Sternites without microtrichia.

Dimensions (holotype female; um). Body length (extended) 952. Head length 207.4, median width 125.8; preocellar setae length 35.7; interocellar setae length 27.2; dorsal eye length 61.2; antennal segments length: I 17.8; II 35.7; III 40.8; IV 39.9; V 35.7; VI 49.3; V 17. Pronotum length 115.6, median width 136, major setae length: pa I 56.1; pa II 54.4.

Type data. **Holotype** female, PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro, on leaves of Moraceae, 20-VI-1987, C. P. Reyes (**UPLB**). Paratypes (2 females) same data as holotype (**UPLB**).

Male. Unknown

Material examined. Type series only (**UPLB**).

Etymology. Denticulatus is a Latin word meaning "small teeth" in reference to the dentate microtrichia on posterior margin of abdominal tergites V-VIII of these thrips.

Distribution (Fig. 50). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro.

Host. Unlike most known members of the genus *Stenchaetothrips* which usually feed on plants belonging to Graminae or Compositae (Bhatti, 1982), this species was found feeding on the leaves of a moraceous plant.

***Stenchaetothrips minutus* (van Deventer)**
Thrips minuta van Deventer, 1906: 276, 281.
Baliothrips minutus (van Deventer); Jacot-Guillarmod, 1974: 714.
Holotype female, Indonesia: Java (**?Lost**) [not examined]

Diagnosis. Body brown. Head about as long as wide. Interocellar setae outside ocellar triangle. Postocular setae pair III much longer than pair I. Antennae predominantly yellow. Legs yellowish. Forewings brown; basal quarter pale. Metascutum with campaniform sensilla. Abdominal tergites VI and VII with or without dentate microtrichia on posterior margins. Sternites without teeth.

Female macroptera. Head about as long as wide or slightly wider; transversely striate posteriorly. Preocellar setae much longer than interocellar setae; interocellar setae outside ocellar triangle. Postocular setae pair III much longer than pair I. Antennae predominantly yellow; segment IV yellow in basal half, brownish in apical half. Mouthcone elongate, narrowly rounded.

Pronotum smooth setose; discal setae well developed; posteromarginal setae mesad to angulars, 3 pairs; posteroangular setae with inner pair slightly longer than outer pair. Legs yellowish. Forewings brown; basal quarter pale; anterior vein with 7 basal and 3 distal setae; posterior vein with 9 setae; posterior fringe cilia wavy; scale yellowish. Mesonotum with few transverse striae. Mesosternal spinula absent. Metascutum transversely striate on anterior quarter, longitudinally striate on posterior three-quarters; median setae behind anterior margin; campaniform sensilla present.

Abdominal tergites VI and VII with or without dentate microtrichia. Tergite VIII with well developed comb of microtrichia on posterior margin. Tergites IX and X with well developed, dark apical setae, pointed at apex. Tergite X completely divided longitudinally. Sternites without teeth.

Male macroptera. Similar to female in structure and color. Abdominal sternites III to V each with glandular area (Ananthakrishnan, 1966). Not yet known from the Philippines.

Material examined. 5 females, Sipit Saburan, Puerto Gallera, Oriental Mindoro, on *Saccharum officinarum*, 20-VI-1987, C. P. Reyes; 1 female, Aidsisa, Silay City, on *Saccharum officinarum*, 26-V-1987, C. P. Reyes; 1 female, FORI, Camp Susana, La Paz, Zamboanga on leaf of *Phragmitis*, 12-VII-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 50). The known range of this species extends from India eastward in Papua New Guinea, to the Pacific Islands and to Brazil. In the Philippine Archipelago, this species is known from the islands of Visayas and Mindanao. PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera; Aidsisa, Silay City; Mindanao: FORI, Camp Susana, La Paz Zamboanga. NEW GUINEA. NEW BRITAIN. INDIA. INDONESIA: Java. TAIWAN. JAPAN. BRAZIL. U.S.A.: Hawaii.

Hosts. *Saccharum officinarum*, leaf of *Phragmitis* sp., *Panicum barbinode*, *Saccharum spontaneum*, leaves of *Zea mays*, *Panicum purpurescens*, *Lantana* sp.

***Stenchaetothrips spinalis*, n. sp.**
Holotype female, Philippines: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro (**UPLB**)
Figure 49a, b, c, d

Diagnosis. Body brown. Head and thorax light brown, abdomen darker. Interocellar setae outside ocellar triangle. Antennal segments generally brown. Pronotal posteromarginal setae mesad angulars, 3 pairs. Legs generally yellow, with ~~darker lateral~~ margins; femora shaded with light brown medially. Forewings brown; basal quarter paler; anterior vein with 3 distal setae. Mesosternal spinula present. Posterior margins of tergites VI and VII with dentate microtrichia laterally; those on VIII complete.

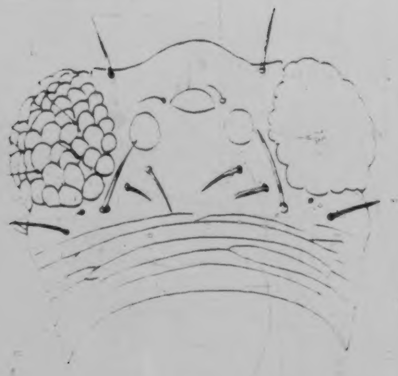
Members of this genus usually lack a mesosternal spinula but adults of *S. spinalis*, n. sp. have this structure. This species also differ from *S. denticulatus* n. sp. in having a uniformly brown body and forewings.

Female macroptera. Head light brown, wider than long; transversely striate posteriorly (Fig. 49a). Preocellar setae longer than interocellars. Interocellar setae placed outside ocellar triangle. Postocular setae pair III longer than pair I. Antennae predominantly brown; apex of segment II and segment III pale; segments III and IV each with a forked sense cone (Fig. 49b). Mouthcone elongate, rounded (Fig. 49a).

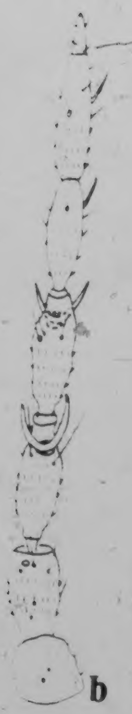
Pronotum light brown; major setae well developed; posteromarginal setae mesad to angulars, 3 pairs; posteroangular setae subequal (Fig. 49c). Legs yellowish, with darker lateral margins; femora shaded with brown medially. Forewings brown, with pale basal quarter; anterior vein with 7 basal and 3 distal setae; posterior vein with 11 to 13 setae (Fig. 49d). Mesonotum with transverse striae. Mesosternal spinula present. Metascutum transversely striate on anterior third, longitudinally striate on posterior two-thirds; median setae placed behind anterior margin; campaniform sensilla present.

Abdomen brown. Posterior margin of tergites VI and VII with few , weak, dentate microtrichia laterally. Tergite VIII with complete comb of fine microtrichia on posterior

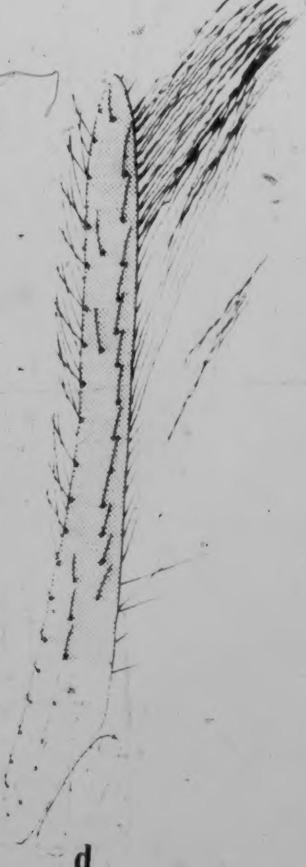
Fig. 49. *Stenchaetothrips spinalis*, n. sp., female holotype. a. Head b. Right antenna c. Pronotum d. Forewing



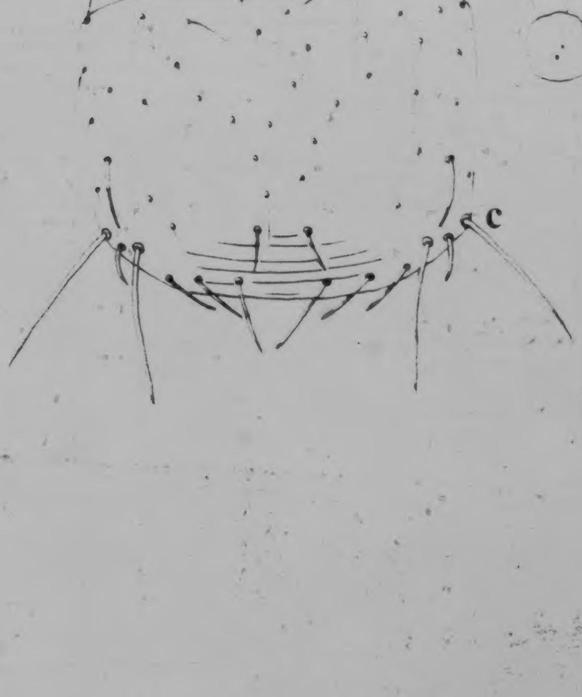
a



b



d



c

margin. Setae B1 and B2 of tergites IX and X developed. Sternite VII with inner pair of posteromarginal setae in front of posterior margin. Sternites without accessory setae.

Dimensions (holotype female; um). Body length (extended) 1387.2. Head length 110.5; median width 139.4; preocellar setae length 42.5 interocellar setae length 22.9; postocular setae length 32.3; dorsal eye length 61.2; antennal segments length: I 30.6; II 39.1; III 57.8; IV 52.7; V 47.6; VI 54.4; VII 17. Pronotum length 122.4, median width 164.9, major setae: pa I 68; pa II 66.3.

Type data. **Holotype** female, PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro, on *Bambusa* sp., 20-VI-1987, C. P. Reyes (**UPLB**). **Paratypes** (12 females) same data as holotype (**UPLB**).

Male. Unknown.

Material examined. Type series only (**UPLB**).

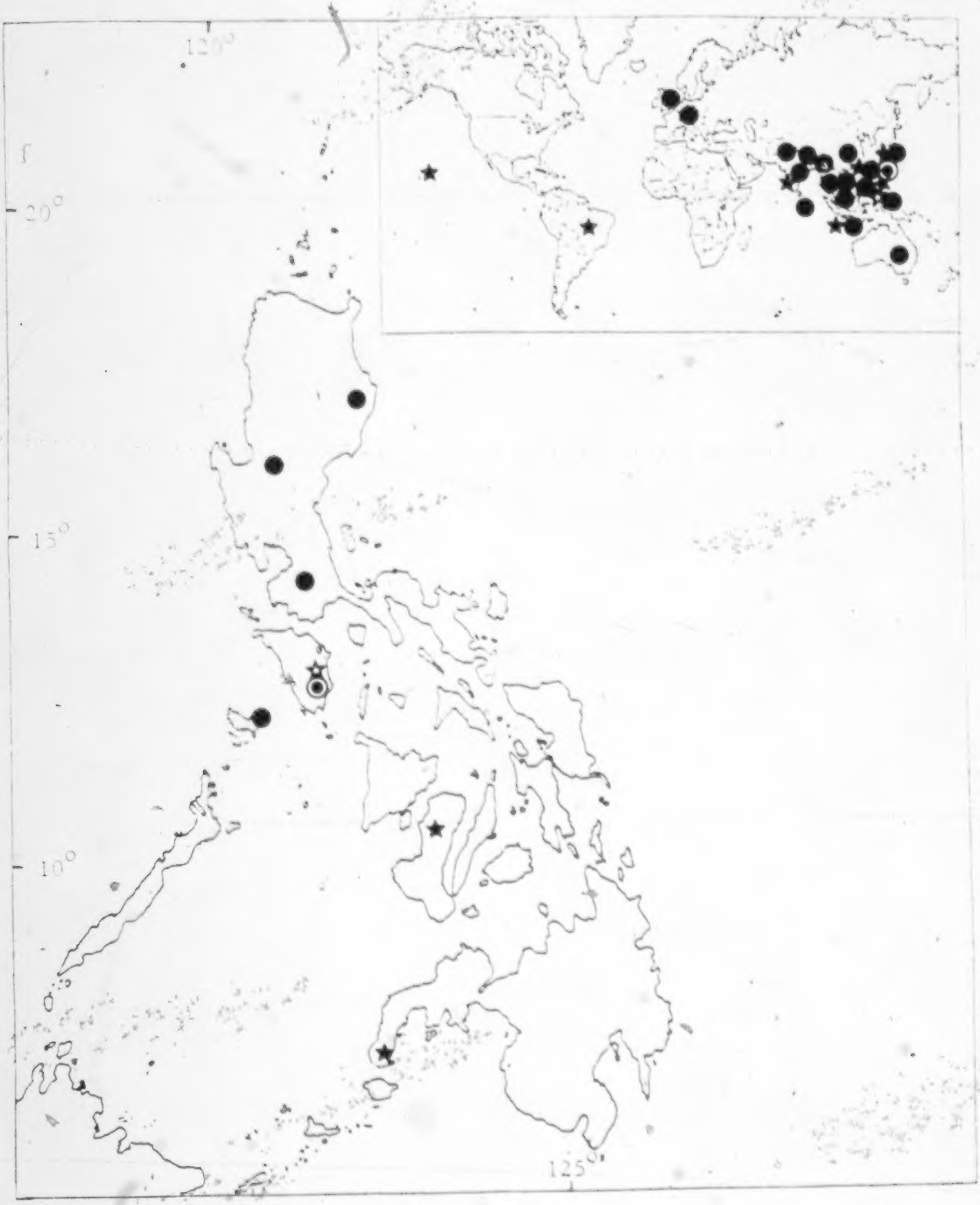
Etymology. Spinalis is a Latin word meaning "spine or backbone" in reference to the presence of the sternal spinula on metasternum of these thrips.

Distribution (Fig. 50). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro.

Host. *Bambusa* sp.

Fig. 50 Distribution of *Stenchaetothrips* species in the Philippines, and world.

● *S. biformis* (Bagnall)
☆ *S. denticulatus*, n. sp.
★ *S. minutus* (van Deventer)
◉ *S. spinalis*, n. sp.


120°
20°
15°
10°
125°

Genus *Thrips* Linnaeus

Thrips Linnaeus, 1758: 457.
Type species: *Thrips physapus* Linnaeus, by subsequent designation of Curtis, 1839.

Diagnosis. Head about as long as wide or wider. Ocellar setae pair I absent. Interocellar and postocular setae short. Postoculars in a row, none especially developed. Antennae 7- to 8- segmented; segments III and IV each with forked sense cone; segment VI slightly enlarged in males of few taxa; segment II with median dorsal seta basad of campaniform sensillum. Maxillary palpi 3- segmented. Mouthcone rounded.

Pronotum transverse, with 3-4 pairs of setae mesad major posteroangulars; posteroangulars well developed; discal setae developed or not. Tarsi 2-segmented, unarmed, with a tooth in few taxa; hindtibiae without long setae on outer margins. Macropterous, micropterous, or brachypterous. Anterior vein of forewings with row of setae either broadly interrupted , nearly complete, or complete; posterior vein with many setae; posterior fringe cilia wavy. Mesonotum with median pair of setae placed far ahead of posterior margin. Metascutum longitudinally striate to reticulate. Mesosternal spinula present. Metasternal spinula absent.

Abdominal tergite I striate. Median pair of setae placed far apart on intermediate tergites. Tergites with or without small scallop-like projections along posterior margins. Lateral ctenidia on abdominal tergites V-VIII, on VIII placed posterior of spiracles. Posterior margin of tergite VIII with or without complete comb of microtrichia. Tergite X divided longitudinally. Males with glandular area on each of sternites III and IV, III-V, or more usually, III-VII, round to oval to transversely elongate in shape; tergite IX without thorn-like setae. Sternal accessory setae present or absent.

Adults of species of *Thrips* with 8 antennal segments can be differentiated from those of the closely related species of *Taeniothrips* (not known from the Philippines) by the presence of ctenidia on abdominal tergites V-VIII. Bhatti (1980b) and Mound and Palmer (1981a) interpreted this genus in a broad sense and provided advice on how to identify the species. This genus is one of the largest containing flower feeding with more than 200 species known worldwide, of which 20 species, including 1 new to science, are known from the Philippines.

Key to Philippine species of *Thrips* Linnaeus

1 Metascutal sculpture reticulate and with or without wrinkles within reticules .. 2

1' Metascutal sculpture with transverse or longitudinal striae 10

2(1) Accessory setae absent on abdominal sternites 3

2' Accessory setae present on abdominal sternites 4

3(2) Anterior vein of forewings with almost complete row of setae; legs yellowish .... *T. malloti* Priesner

3' Anterior vein of forewings with 4 or 5 distal setae; legs brownish .... *T. morindae* Priesner

4(2') Laterotergites of abdomen with rows of microtrichia; body brown with yellow to orange subintegumental pigment .... *T. simplex* Morison

4' Laterotergites of abdomen without rows of microtrichia; body uniformly brown 5

5(4') Antennal segments slender; accessory setae on abdominal sternites, 2 pairs or absent .... *T. orientalis* (Bagnall)

5' Antennal segments robust; 1 to 5 pairs of accessory setae on abdominal sternites 6

6(5') Abdominal tergites II to VIII each with a distinct brown, acrotergal ridge near anterior margin; anterior vein of forewings with 4 distal setae .... *T. taiwanus* (Takahashi)

6' Abdominal tergites without transverse, dark brown markings 7

7(6') Anterior vein of forewings with complete row of setae; abdominal sternites each with 5 pairs of accessory setae .... *T. parvispinus* (Karny)

7' Anterior vein of forewings with 3 to 4 distal setae 8

8(7') Abdominal segment X long; interocellar setae placed outside ocellar triangle; forewings with 3 distal setae .... *T. longicaudatus* (Bianchi)

8' Abdominal segment X normal; interocellar setae outside or inside ocellar triangle 9

9(8') Abdominal tergite VIII with incomplete comb of microtrichia on posterior margin; anterior vein of forewings with 4 distal setae (Fig. 54d) .... *T. palmerae*, n. sp.

9' Abdominal tergite VIII without comb of microtrichia on posterior margin; an[illegible]ein of forewings with 3 distal setae .... *T. subnudula* Karny

10(1') Laterotergites of abdomen with rows of microtrichia; metascutum without campaniform sensilla; anterior vein of forewings with 4 to 7 distal setae .... *T. tabaci* Lindeman

10' Laterotergites of abdomen without rows of microtrichia; metascutum with or without campaniform sensilla 11

11(10') Metascutum with median setae each on tubercle, placed close together along anterior margin, campaniform sensilla present .... *T. brevistylus* Priesner

11' Metascutum with inner setae not on tubercles, variously placed with respect to anterior margin 12

12(11') Abdominal tergite VIII without or with incomplete comb of microtrichia 13

12' Abdominal tergite VIII with complete comb of microtrichia 15

13(12) Antennal segment VI more slender than segment III, with 2 long setae; metascutal sculpture of closely spaced, longitudinal striae medially .... *T. vitticornis* (Karny)

13' Antennal segment VI broad, with shorter setae; abdominal tergite VIII with fine, long comb of microtrichia on posterior margin 14

14 (13') Abdominal sternites with accessory setae; forewings brown; femora brownish yellow .... *T. sumatrensis* Priesner

14' Abdominal sternites without accessory setae; forewings and legs yellow .... *T. flavus* Schrank

15(12') All postocular setae developed; metascutum with median setae behind anterior margin. campaniform sensilla present .... *T. victoriensis* Priesner

15' One or two pairs of postocular setae not developed; metascutum with median setae inserted along or just behind anterior margin 16

16(15') Forewings brown with anterior vein with 4 distal setae; metascutum with median setae behind anterior margin, campaniform sensilla present; antennal segment I pale .... *T. nigropilosus* Uzel

16' Forewings hyaline or brownish with anterior vein with 2 or 3 distal setae ... 17

17(16') Metascutum with striae convergent posteriorly, inner metascutal setae behind anterior margin .... *T. palmi* Karny

17' Metascutum with striae not convergent posteriorly; antennal segments I and II brown; forewings brown except basal quarter, with anterior vein having 2 or 3 distal setae 18

18(17') Metascutum with median setae behind anterior margin, campaniform sensilla absent; anterior vein of forewing with 2 distal setae .... *T. tuscus* Moulton

18' Metascutum with median setae inserted along anterior margin, campaniform sensilla present; anterior vein of forewing with 3 distal setae 19

19(18') Mesonotum with anteroangular areas striated by near anterior campaniform sensilla; abdominal sternite VII with 13 to 19 accessory setae .... *T. hawaiiensis* (Morgan)

19' Mesonotum with anteroangular area without striations; abdominal sternite VII with 8 to 12 accessory setae .... *T. florum* Schmutz

Thrips brevistylus **(Priesner)**
Taeniothrips brevistylus Priesner, 1938:496.
Holotype female, Indonesia: G. Gedeh, Tjibodas, Java (SMFG) [examined]

Diagnosis. Body brown. Head slightly wider than long. Interocellar setae inside ocellar triangle. Postocular setae pair II and IV minute. Antennae 8-segmented, bicolored. Pronotum with closely spaced transverse striae. Legs bicolored. Forewings brown with small subbasal pale area. Metascutum transversely striate on anterior half, striae in form of subcircular pattern on anterior median half; median setae close together on anterior margin each on separate tubercle. Abdominal tergite VIII with complete comb of fine microtrichia on posterior margin. Abdominal sternites with accessory setae.

This is the first record of *T. brevistylus* in the Philippines. Males collected from the Philippines are the first for the species.

Female macroptera. Head slightly wider than long; transversely striate on posterior half. Interocellar setae longer than postoculars, inside ocellar triangle. Eyes more than 0.5 times as long as head. Postocular setae pair I well developed; pairs III and IV minute. Antennae 8-segmented; segments I and II brown; III yellowish and various in size, about 0.5 times as long as IV in few taxa; segments IV and V pale basally, brown apically; VI to VIII brownish; segments III and IV each with forked sense cone; segments V to VII sometimes in form of single unit. Mouthcone elongate, narrowly rounded.

Pronotum with closely spaced, transverse striae; moderately setose; posteroangular setae prominent, subequal. Legs yellowish except femora brown with pale apices. Forewings brown; with small subbasal pale area; anterior vein with 7 basal and 3 distal setae; posterior vein with 11 to 12 setae; posterior fringe cilia wavy; scale brown. Mesonotum transversely striate; striae closely spaced. Metascutum transversely striate with striae in form of subcircular pattern on anterior median half; longitudinally striate laterally and posteriorly; median setae placed close together on anterior margin, each on separate tubercle; campaniform sensilla present. Metascutellum longitudinally striate.

Abdominal tergite I with circular striae anteriorly. Tergite VIII with complete comb of fine microtrichia on posterior margin. Tergites IX and X with long, dark apical setae. Tergite X entire or incompletely divided longitudinally. Sternites without accessory setae. Sternite VII with median setae placed before posterior margin.

Male macroptera. Similar to female in structure. Body bicolored. Head, thorax and legs yellow; abdominal tergites I to VII with brown patch medially, this enlarging and darkening on posterior tergites. Tergite VIII brown. Tergites IX and X light brown. Tergite IX without thorn-like setae; B1 setae slender. Sternites III to VII each with moderately long, transverse glandular area.

Material examined. 1 female, 1 male, Makiling Botanical Garden, Los Banos, Laguna, on "baston ni San Jose", 4-VII-1987, C. P. Reyes; 6 females, 7 males, Mt. Tabiey, Cabigaan, Palawan, on flower of unknown plant, 23-V-1987, V. Fernando; 1 female, VISCA, Baybay, Leyte, on tassel of *Zea mays*, 12-V-1987, C. P. Reyes (**CPRC**); 1 female, 1 male, Mt. Tabiey, Cabigaan, Palawan, on flower of unknown plant, 23-V-1987, V. Fernando (**SMFG**).

Distribution (Fig. 51). The known range of this species extends from the Philippine to the Indonesian Archipelago. In the Philippines, this species is known from the three principal zoogeographic regions, on the islands of Luzon, Palawan and Visayas. PHILIPPINES: Luzon: Makiling Botanical Garden, Los Banos, Laguna; Palawan: Mt. Tabiey, Cabigaan; Visayas: VISCA: Baybay, Leyte. INDONESIA: Java.

Hosts. "baston ni San Jose", flower of unknown plant, *tassel of Zea mays*, flowers of *Corymbis veratrifolia*

Thrips flavus Schrank
Thrips flava Schrank, 1776:31.
Holotype female, Austria(**?unknown**) [not examined]
Thrips clarus Moulton, 1936: 269.

Diagnosis. Body usually yellow but variable. Head wider behind eyes. Interocellar setae behind foreocellus. Antennae 7 or 8-segmented; segments I and II yellowish to whitish; III pale yellow to brown in apical three quarters; IV yellow on basal third to completely dark brown; VI to VIII dark brown. Pronotum setose. Legs and forewings yellow; anterior vein usually with 3 distal setae. Metascutum transversely striate on median anterior quarter; longitudinally striate on posterior three-quarters. Abdominal tergite VIII with complete comb of long, fine, regular microtrichia on posterior margin. Abdominal sternites without accessory setae. *T. flavus* is a highly variable and polyphagous species. My interpretation follows that of Bhatti (1980b).

Female macroptera. Head about as long as wide or slightly longer; wider behind eyes; transversely striate posteriorly. Interocellar setae well developed and placed behind foreocellus inside ocellar triangle. Postocular setae pair I well developed; pair II minute. Antennae 7 or 8-segmented; segments I and II yellowish to whitish; III pedicellate, pale yellow to brown in apical three quarters; IV yellow on basal third to completely dark brown, always with brown ring at base; VI to VIII dark brown; VI sometimes with pale base; segments III and IV each with forked sense cone. Mouthcone elongate, rounded.

Pronotum setose; discal setae well developed; anteromarginal setae not conspicuous; posteromarginal setae mesad angulars, 3 pairs; inner pair longest; posteroangular setae about 2 times as long as inner pair of posteromarginals. Legs yellowish; forefemora slightly enlarged. Forewings yellow; costal setae at base of forewings fairly long, slender; anterior vein with 7 basal and usually 3 distal setae, 2 or 4 in few individuals; posterior vein with 12 -16 setae; posterior fringe cilia wavy. Mesonotum transversely striate. Metascutum transversely striate on median anterior quarter; longitudinally striate on posterior three-quarters; median setae placed behind anterior margin; campaniform sensilla absent.

Abdominal tergite II with 4 lateral setae on either side. Tergite VIII with complete comb of long, fine, regular microtrichia on posterior margin. Tergites IX and X with well developed, dark apical setae. Sternites and laterotergites without accessory setae.

Male macroptera. Similar to female in structure. Setae S2 on tergites III to V shorter than S4. Tergite VIII without comb of microtrichia on posterior margin. Sternites III to VII each with transverse glandular area.

Material examined. 4 damaged specimens, Concepcion, Cadiz, Negros Occidental, on flowers of "Quigar", 16-V-1928, W. D. Pierce; Sta. Margarita, Saravia, Negros Occidental, on *Stachytarpheta jamaicensis*, 7-VI-1929, W, D. Pierce (Moulton Coll.) (**CASC**).

Distribution. This species has a cosmopolitan distribution. In the Philippine Archipelago, this species is known from the island of Visayas. PHILIPPINES: Visayas: Concepcion, Cadiz, Negros Occidental; Sta. Margarita, Saravia, Negros Occidental.

Hosts. flowers of "Quigar", *Stachytarpheta jamaicensis*, on numerous plants.

***Thrips florum* Schmutz**

Thrips florum Schmutz, 1913: 1003.
Holotype female, Sri Lanka: Peradenya (**Vienna**) [not examined]
Thrips florum Schmutz; Nakahara, 1985: 869.

Diagnosis. Body brown to dark brown with orange subintegumental pigmentation in thorax and head. Head wider than long. Interocellar setae placed outside ocellar triangle. Antennae 7-segmented, sometimes 8; segments I and II brownish, II pale apically; III yellow; segments IV and V brown, pale basally; VI to VIII brown. Forefemora yellowish brown; mid and hindfemora brown with pale apices; tibiae and tarsi yellow. Forewings brown, pale basally; anterior vein with 3 distal setae. Pronotum with posteroangular setae 66-85 um. Mesonotum lack striations in anteroangular area adjacent to campaniform sensilla. Abdominal sternite VII with 8-12 accessory setae.

This species is closely related to *T. hawaiiensis*. Nakahara (1985) studied several specimens belonging to both species from different countries including those from the Philippines.

Female macroptera. Head wider than long; transversely striate posteriorly. Interocellar setae outside ocellar triangle. Postocular setae pair 1 developed; pair II minute. Antennae usually 7-segmented, sometimes 8; segments I and II brownish, II with pale apex; III yellow; IV and V brown, with pale base; VI to VIII brown. Mouthcone rounded.

Pronotum with 3 pairs of posteromarginal setae mesad angulars; posteroangular setae developed, 66-85um. Forefemora yellowish brown; mid and hindfemora brown with pale apices; tibiae and tarsi yellow. Forewings brown, with pale base; anterior vein with 7 basal and 3 distal setae; posterior fringe cilia wavy. Mesonotum with striae except smooth in anteroangular area adjacent to campaniform sensilla. Metascutum transversely striate on anterior third, longitudinally striate on posterior two-thirds; median setae at or near anterior margin; campaniform sensilla present.

Abdominal tergite 1 with transverse, anastomosed striae. Tergite VIII with fine comb of microtrichia on posterior margin. Tergite IX with B1 setae long, pointed apically. Tergite X divided longitudinally on posterior two-thirds, entire on anterior third. Abdominal sternite VII with 8 to 12 accessory setae.

Male macroptera. Similar to female in structure. Body color yellowish. Posterior setae on abdominal tergite IX with mesal pair longer and stouter than lateral pair. Abdominal sternites III to VII each with elongate, transverse glandular area.

Material examined. 2 females, Philippines: Luzon: Manila, taken in quarantine at Honolulu, Hawaii, on cut flowers (**USNM**).

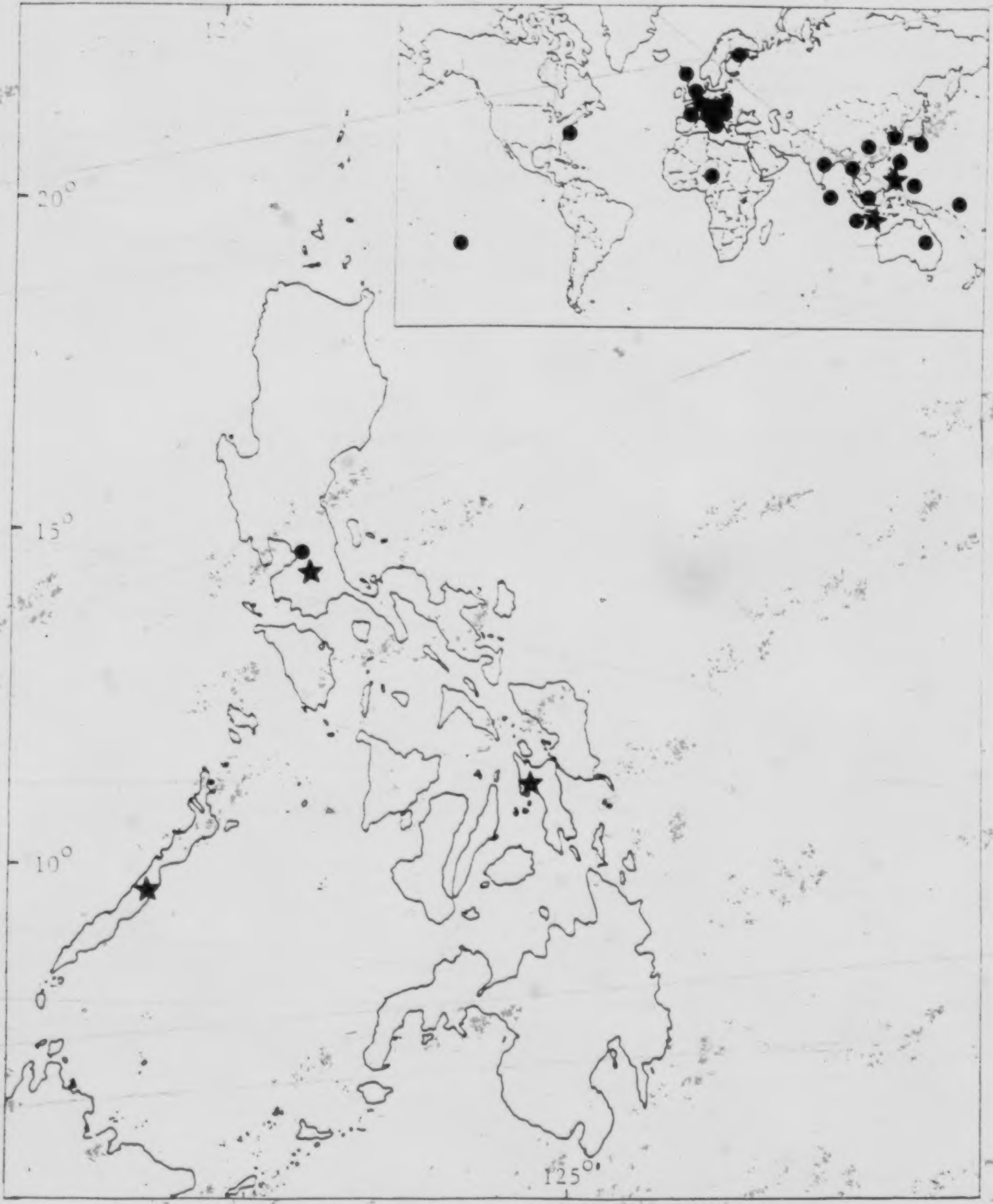
Distribution (Fig. 51). The known range of this species extends from Europe eastward in the Indo-Australia Archipelago, to the Solomon Islands and northward to the United Staes. In the Philippines, this species is known from the island of Luzon. PHILIPPINES: Luzon: Manila, taken in quarantine at Honolulu, Hawaii. INDONESIA: Java. MALAYSIA. THAILAND. INDIA. CHINA. KOREA. JAPAN. TAIWAN. SRI LANKA. AUSTRALIA. SOCIETY IS. SOLOMON IS. DOMINIA. NIGERIA. AUSTRIA. FINLAND. GERMANY. CZECHOSLOVAKIA. HUNGARY. ITALY. AZORES. POLAND. SWEDEN. HOLLAND. RUMANIA. YUGOSLAVIA. DENMARK. FRANCE. U.K.: England, Scotland, Wales. IRELAND. SWITZELAND. RUSSIA. SIBERIA. TRANSCAUCASIA. TURKESTAN. UZBEKISTAN. U.S.A.: New York.

Hosts. cut flowers, on numerous plants

Fig. 51. Distribution of *Thrips brevistylus* (Priesner) and *Thrips florum* Schmutz in the Philippines. and world.

★ *T. brevistylus* (Priesner)

● *T. florum* Schmutz


120°
20°
15°
10°
125°

Thrips hawaiiensis (Morgan)
Euthrips hawaiiensis Morgan, 1913: 3
Syntype female, Hawaii: Honolulu (**USNM**)[examined]
Thrips albipes Bagnall; Moulton, 1936:269.
Thrips pallipes Bagnall; Moulton, 1936:269.
Thrips hawaiiensis (Morgan); Nakahara, 1985: 868.

Diagnosis. Body bicolored, head and thorax yellow or yellowish orange, or brown with orange subintegumental pigmentation, abdomen brown. Head slightly wider than long. Interocellar setae outside ocellar triangle. Antennae 8-segmented, 7 in few individuals; segments I and II brown, II pale apically; III and base of IV yellow; apex of IV and segments V to VII or VIII brown. Forewings brown; basal quarter pale; anterior vein with 3 distal setae. Pronotum with posteroangular setae 33-63um. Legs predominantly yellow. Mesonotum striate in anteroangular area adjacent to anterior campaniform sensilla. Abdominal sternite VII with 13 to 19 accessory setae.

Adults of *T. hawaiiensis* vary in color and are similar in structure to those of *T. florum* . In this work, *T. florum* is treated as a distinct species, however, I placed only those specimens studied by Nakahara under this name. I did not attempt to allocate to each of these two species since I am not fully convinced that they are distinct from each other.

Female macroptera. Head slightly wider than long. Interocellar setae placed nearly lateral to preocellar setae outside ocellar triangle. Postocular setae pair I well developed.. Antennae 7 or 8-segmented; segments I and II brown, II pale apically; III and base of IV yellow; apex of IV and segments V to VII brown; segments III and IV each with forked sense cone. Mouthcone elongate, rounded.

Pronotum transversely striate; posteromarginal setae mesad angulars 3 pairs, inner pair longest; posteroangular setae 33-62um. Legs predominantly yellow; femora brownish on outer margin; tibiae and tarsi yellow. Forewings brown, basal quarter pale; vein setae dark; anterior vein with 3 distal setae; posterior fringe cilia wavy. Mesonotum striate in anteroangular area adjacent to anterior campaniform sensilla. Metascutum transversely striate medially on anterior third; longitudinally striate on posterior two-thirds; median pair of setae placed along anterior margin; campaniform sensilla present.

Abdominal tergite II with 4 lateral setae on each side. Tergite VIII with complete comb of irregular microtrichia on posterior margin. Tergites IX and X with apical setae long, pointed apically. Pleurotergites without discal setae. Abdominal sternite VII with 13 to 19 accessory setae.

Male macroptera. Similar to female in structure. Body yellowish including wings and antennal segments I to III. Abdominal tergite IX with 4 similar, bristle-like posterior setae, mesal pair usually longer than lateral pair. Abdominal sternites III to VII each with elongate, transverse glandular area.

Material examined. 2 females, Manila, taken in quarantine at Honolulu, on Ilang-Ilang flowers, VII-1952 (**BPBM**); Females and males, Guintabaan, Saravia, Negros Occidental, on *Solanum* sp., 26-IV-1928, W. D. Pierce; Singalong, Manila, Bureau of Plant Industry, Concepcion, Cadiz, on flowers of "Quigar", 16-V-1928, W. D. Pierce; Concepcion, Cadiz, on flowers of *Carica papaya*, 18-V-1928, W. D. Pierce; Sta. Isabel, Victorias, Negros, on *Lantana camara*, 11-IX-1928, W. D. Pierce; Los Banos, Laguna, on flowers of banana, 25-X-1929, on roses and corn, 9-X-1931, I. D. Dobrosky; Los Banos, on flowers of *Gardenia*, 15-VII-1931, I. D. Dobrosky; Batangas, on tangerine, 28-V-1931, I. D. Dobrosky; Alabang, on blossoms of native orange, I. D. Dobrosky, 28-V-1931; Alabang, on legume, 20-X-1931, I. D. Dobrosky, (Moulton Coll.) (**CASC**); 4 females, IRRI, Los Banos, Laguna, on *Thevelia peruxiana*, 4-X-1983, C. P. Reyes; 4 female, on silk of *Zea mays*, 25-VII-1982, C. P. Reyes; 5 females, on *Plumiera acutifolia*, 4-X-1983, C. P. Reyes; 1 male, UPLB, Los Banos, Laguna, on *Jacobinia coccinea*, 13-X-1983, C. P. Reyes; 3 females, on yellow bell, 5-X-1983, M. Ma; 2 females, 10-XII-1984, on flowers of *Jasminum sambac*, 10-XII-1984; 2 females, on *Michelia champaca*, 5-X-1984, C. P. Reyes; 1 female, on shasta daisy, 22-IV-1983, C. P. Reyes; 3 females, on *Carica papaya*, 15-VIII-1983, C. P. Reyes; 2 females, on silk of *Zea mays*, 11-X-1984, E.

Mituda; 1 female, on silk of *Zea mays*, V-1984; 1 female, on *Tagetes erecta*, 17-IX-1984; 5 females, on flowers of *Bixa orellana*, 13-X-1983; 2 females, on butterfly plant, 30-X-1982, C. P. Reyes; 2 females, on *Clitoria fairchildiana*, 8-V-1985, C. P. Reyes; 1 female, on *Carica papaya*, 15-VIII-1982; 1 male, host unknown, 16-VII-1982; 2 females, 4 males, host unknown, 16-VII-1982; 5 females, on *Ervatamia pandacaqui*, 13-X-1983, C. P. Reyes; 4 females, on *Haematoxylon* sp., 16-II-1985, V. P. Gapud; 1 female, on *Anacardium occidentale*, 5-V-1987, C. P. Reyes; 2 females, Makiling Botanical Garden, Laguna, on flowers of unknown tree, 4-VII-1983, C. P. Reyes; 3 females, Mudspring, Mt. Makiling, Laguna, on flower of *Heliconia*, 27-VI-1987, C. P. Reyes; 13 females, BPI, Baguio City, on *Solanum* sp., 8-XII-1984, C. P. Reyes; 4 females, Wright Park, Baguio City, on *Rosa* sp., 8-XII-1984, Oratai and Chantana; 3 females, MSAC, La Trinidad, on *Helianthus annuus*, 8-XII-1984, C. P. Reyes; 2 females, MSAC, La Trinidad, Mt. Province, on Chinese lily, 8-XII-1984, Oratai and Chantana; 2 females, MSAC, La Trinidad, Mt. Province, on *Canna* sp., 8-XII-1984, Oratai and Chantana; 2 females, MMSU, Batac, Ilocos Norte, on unidentified weed, 12-II-1988, E. C. Mituda; 4 females, Sta. Barbara, Pangasinan, on *Gossypium* sp., 17-III-1988, E. C. Mituda; 2 females, Bicol Expt. Sta., Pili, Camarines Sur, on *Leucaena leucocephala*, and of young shoot of Araceae, 5-VI-1987, C. P. Reyes; 2 females, on leaves of *Codiaeum variegatum* and 2 females, on leaves of *Rosa* sp., 4-VI-1987, C. P. Reyes; 1 female, Hiwacloy, Goa, Camarines Sur, on flower of unknown plant, 3-VI-1987, C. P. Reyes; 3 females, 1 male, on *Solanum* sp., 18-V-1987; 8 females, on flowers of *Capsicum annum*, 3-VI-1987; 1 female, on "taratabacco", 3-VI-1987, C. P. Reyes; 20 females, on flowers of yellow bell, 3-VI-1987, C. P. Reyes; 3 females, Mt. Mayon rest house, Albay, on flowers of yellow bell, 6-VI-1987, C. P. Reyes; 2 females, 1 male, San Rafael, Castilla, Sorsogon, on *Psidium guajava*, 6-VI-1987, C. P. Reyes; 1 female, Brooks Point, Palawan, on flowers of *Capsicum annum*, 29-I-1985, C. P. Reyes; 2 females, Tagdidili, Maasin, Brooks Point, Palawan, 30-I-1985, C. P. Reyes; 11 females, Baybay, Leyte, on *Lantana camara*, 4-V-

1983, C. P. Reyes; 1 female, on flower of *Stachytarpheta* sp., 17-VI-1984, S. G. Reyes; 4 females, VISCA, Baybay, Leyte, on *Psidium guajava*, 4-V-1982; 6 females, on Fabaceae, 9-V-1983; 1 female, on *Zea mays*, 5-V-1983, C. P. Reyes; 1 female, on unknown shrub, 12-V-1987, C. P. Reyes; 1 female, Mt. Pangasugan, Leyte, on flower of unknown plant, 4-V-1983, C. P. Reyes; 3 females, on *Plumiera acutifolia*, 4-V-1983; 3 females, on flowers of Adelfa, 13-V-1987; 6 females, on *Solanum* sp., 13-V-1987; 2 females, on flowers of *Glericidia* sp., 12-V-1987, C. P. Reyes; 11 females, Tubigon, Bohol, on *Ageratum conyzoides*, 30-IV-1983, C. P. Reyes; 6 females, Guimaras Expt. Sta., on *Rosa* sp., 23-V-1987, C. P. Reyes; 1 female, La Granja, La Carlota, sweeping grass, 26-V-1987, C. P. Reyes;10 females, Sipit Saburan, Puerto Gallera, Oriental Mindoro, on *Citrus* sp., 19-VI-1987, C. P. Reyes; 7 females, Camp Susana, FORI, Zamboanga, on *Solanum* sp., 12-VII-1987, C. P. Reyes; 5 females, Anuling, Pamocotan, Zamboanga, on leaves of unknown shrub, 11-VII-1987 and 15 females, 2 males, on *Psidium guajava*, II-VII-1987, C. P. Reyes; 2 females, Pasonanca Park, Zamboanga, on *Caesalpinia* sp., 13-VII-1987 and 2 females, on flowers of "maria-maria", 13-VII-1987, C. P. Reyes; 2 females, Pagadian City, on silk of *Zea mays*, VIII-1985, E. Decena; 1 male, Mlang, North Cotabato, on flower of *Amaranthus spinosus*, 17-II-1985; 1 female, on flower of *Gardenia*, 13-V-1987, C. P. Reyes; 1 female, on leaves *Calocasia esculentum*, 17-II-1985; 1 female, on *Sandoricum koetjape*, 17-II-1985, C. P. Reyes; 1 female, Malandag, Malungon, South Cotabato, on *Ipomoea batatas*, 25-II-1985, C. P. Reyes; 1 male, Malungon, South Cotabato, on Zingerberaceae, 23-II-1985; 1 female, on flowers of *Coffea arabica*, 23-II-1985; 5 females, host unknown, 23-II-1985, C. P. Reyes; 1 female, Agko, Mt. Apo, on "aguingay" flower, 4-V-1987 and 1 female, on flower of everlasting, 5-V-1987, C. P. Reyes; 8 females, Bago-Oshiro, Davao City, on flower of "tambis", 4-III-1985; 1 female, 1 male, on *Coffea robusta*, 3-III-1985; 1 female, on leaves with galls of *Mangifera indica*, 3-III-1985, C. P. Reyes; 5 females, Agko, Mt. Apo, on *Gardenia* sp., 16-IV-1983, C. P. Reyes; 4 females, on flower of Araceae, 12-III-1985, C. P. Reyes (

CPRC); 1 female, Mt. Pangasugan, Leyte, on *Zea mays*, 18-VII-1983, A. Almeroda; 1 female, on flower of undetermined tree, 6-V-1983, A. Almeroda (**VISCA**).

Distribution (Fig. 52). The known range of this species extends from Africa eastward in India to the Indo-Australian Archipelago, in the Pacific Islands and northward in the United Kingdom and the United States. In the Philippine Archipelago, this species is known from the four principal zoogeographic regions, on the islands of Luzon, Palawan, Visayas and Mindanao. PHILIPPINES: Luzon: Manila, taken in quarantine at Seattle, Washington; Anchorage, Alaska; Honolulu Hawaii. Palawan; Visayas; Mindanao. INDONESIA : Java. MALAYSIA. THAILAND. TAIWAN. BRUNEI. VIETNAM: Laos. KOREA. SRI LANKA. INDIA. BANGLADESH. PAKISTAN. HONGKONG. JAPAN. CHINA. NEW GUINEA. TAHITI. FIJI. AUSTRALIA. NEW ZEALAND. HENDERSON IS. MANGREVA IS. HAO IS. RAPA IS. MIDWAY IS. CAMPBELL IS. MARIANA IS. UGANDA. SIERRA LEONE. RIOUW ARCH. ANGOLA. NIGERIA. U.K.: England. U.S.A: Hawaii.

Hosts. *T. hawaiiensis* is among the highly polyphagous, common terebrantians in the Philippines. Adults are usually collected on flowers and leaves of plants belonging to the family Compositae.

***Thrips longicaudatus* (Bianchi)**
Taeniothrips longicaudatus Bianchi, 1953: 94.
Holotype female, Samoa: Afiamalu, Upolu (**BPBM**)[examined]
Isochaetothrips longicaudatus (Bianchi); Jacot-Guillarmod, 1974: 841.
Thrips longicaudatus Bianchi; zur Strassen, 1973: 153-154.

Diagnosis. Body yellowish brown. Head wider than long. Interocellar setae outside ocellar triangle. Antennae 8-segmented; segments III whitish and about as long as segment IV. Forelegs stout, brownish; tarsi whitish. Forewings brownish, basal quarter pale; anterior vein complete row or setae or with 3 distal setae. Metascutum transversely striate on median anterior quarter, longitudinally reticulate on posterior three-quarters. Abdominal tergite X long, slender, cylindrical. Ovipositor long, slender, surpassing apex of tergite X.

This species is unique among members of Thripinae in having long and slender abdominal tergite X and ovipositor.

Female macroptera. Head wider than long, with few transverse anastomosing striae posteriorly. Eyes protruding. Interocellar setae short, about as long as postoculars and placed outside ocellar triangle. Postocular setae well developed. Cheeks strongly arched. Antennae 8-segmented; segment III whitish and about as long as IV each with forked sense cone. Mouthcone rounded.

Pronotum wider than long; rectangular with rounded anterior and posterior angles; posteromarginal setae mesad angulars 3 pairs, inner pair longest; posteroangular setae 2 pairs, inner pair longer than outer pair. Forelegs stout, brownish; tarsi whitish; hindtibiae with 3 stout apical setae; inner margins with row of 14 or 15 weaker, spine-like setae. Forewings brownish, basal quarter pale; anterior vein usually with complete row of setae, with 3 distal setae in few individuals; posterior vein with 16 setae. Mesonotum with transverse anastomosed striae. Metascutum transversely striate on anterior quarter, longitudinally reticulate on posterior three-quarters; median setae placed near anterior margin; campaniform sensilla present.

Abdominal tergites IV to VII with pair of weak, wing retaining setae; tergites IX and X with dark, well developed apical setae. Tergite X long, slender, cylindrical, not completely divided longitudinally. Ovipositor long, slender, surpassing apex of tergite X. Sternites with accessory setae.

Male. Unknown

Material examined. 2 females, College, Laguna, on *Citrus* sp. plantation of UPCA campus, 28-IV- 1968, D. Z. Llamas (**SMFG**).

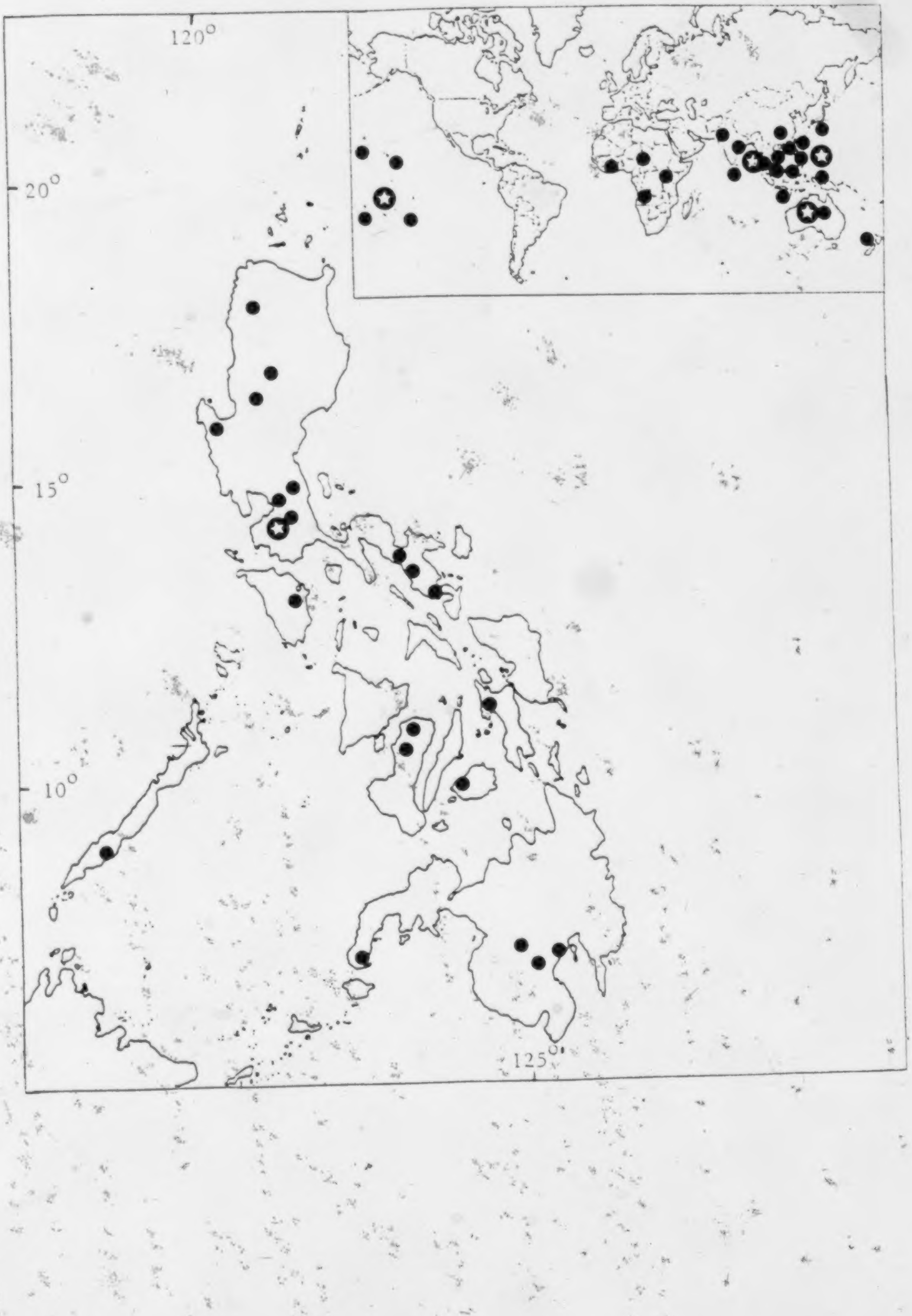
Distribution (Fig. 52). The known range of this species extends from Thailand eastward in Australia to Pacific Islands. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: College, Laguna. THAILAND. SAMOA. AUSTRALIA. PAPUA NEW GUINEA.

Host. *Citrus* sp.

Fig. 52. Distribution of *Thrips hawaiiensis* (Morgan) and *Thrips longicaudatus* (Bianchi) in the Philippines, and world.

● *T. hawaiiensis* (Morgan)

✪ *T. longicaudatus* (Bianchi)


120°
20°
15°
10°
125°

***Thrips malloti* (Priesner)**
Thrips (Isoneurothrips) malloti Priesner, 1934: 269.
Thrips (*Isothrips*) *malloti* Priesner; Jacot-Guillarmod, 1975: 1078.
Lectotype female, Indonesia: Java (**SMFG**)[examined]
Isoneurothrips rosaceae Moulton; Moulton, 1936: 272.
Thrips (*Isothrips*) *addendus* Priesner; Jacot-Guillarmod, 1975: 1078.

Diagnosis. Body brown. Head wider than long. Antennae 7-segmented; segments I and II brown; pale apically; IV to V pale on basal half, brown on apical half; VI to VII brown. Legs yellowish; outer margin of femora brownish. Forewings brown, pale in basal quarter; anterior vein with nearly complete row of setae. Metascutum reticulate. Abdominal tergite VIII without comb of microtrichia on posterior margin.

Female macroptera. Head wider than long; transversely striate posteriorly. Interocellar setae inside ocellar triangle, immediately behind foreocellus. Eyes slightly prolonged ventrally. Postocular setae pair I and III prominent. Antennae 7-segmented; segments I and II brown, II pale apically; IV and V pale on basal half, brown on apical half; VI and VII brown; segments III and IV each with forked sense cone. Mouthcone elongate, rounded.

Pronotum setose; posteromarginal setae mesad angulars 3 pairs; posteroangular setae well developed, subequal. Legs yellowish; outer margins of femora brownish; hindtibiae with 2 spine-like setae at apex. Forewings brown, pale in basal quarter; anterior vein with nearly complete row of setae; posterior fringe cilia wavy; scale brown. Mesonotum smooth anteriorly, transversely striate medially; striae convergent medially on posterior third. Metascutum reticulate; median setae placed behind anterior margin.

Abdominal tergite VIII with median pair of posteromarginal setae placed before posterior margin; comb of microtrichia on posterior margin absent. B1 setae of tergite IX long, pointed at apex. Sternites without accessory setae. Sternite VII with median pair of posteromarginal setae before posterior margin.

Male macroptera. Similar to female in structure. Body color lighter. Antennal segments I to III yellow. Abdominal sternites III to VII each with transverse glandular area.

Material examined. Holotype female of *Isoneurothrips rosaceae* Moulton, Los Banos, Laguna, on a rose bush with white flower, 9-VII-1931, I.D.Dobrosky (Moulton Coll.); **Paratype** (1 female) same data as holotype. Others: 1 male, Cadiz Viejo, Negros Occidental, on *Premna integrifolia*, 5-VI-1929, W. D. Pierce; 1 female, Los Banos, Laguna, on flower of *Gardenia*, July 15,1931, I. D. Dobrosky; 1 male, June 5,1929, W. D. Pierce (Moulton Coll.) (**CASC**); 1 female, UPLB, Los Banos, Laguna, host unknown, 16-VII-1982, C. P. Reyes; 1 female, on *Ervatamia pandacaqui*, 13-X-1983, C. P. Reyes; 1 male, on silk of *Zea mays* , 9-IX-1984, M. Alba; 1 female, 1 male, on *Plumiera acutifolia*, 2-III-1985, J. Catindig; 3 females, MMSU, Batac, Ilocos Norte, on *Helianthus annuus*, 9-IV-1985, C. P. Reyes; 1 male, Hiwacloy, Goa, Camarines Sur, on flower of unknown plant, 3-VI-1987, C. P. Reyes; 1 female, VISCA: Baybay, Leyte, on *Nelumbium speciosum*, 6-V-1983, C. P. Reyes; 1 female, on *Plumiera acutifolia*, 4-V-1983, C. P. Reyes; 1 female, on 'anubing" tree, 13-V-1987, C. P. Reyes; 4 females, 1 male, Agko, Mt. Apo, on flower of unknown plant, 5-V-1987, C. P. Reyes; 1 female, Mlang, North Cotabato, on *Cajanus cajan*, 18-II-1985, C. P. Reyes; 2 females, on *Citrus* sp., 17-II-1985, C. P. Reyes (**CPRC**).

Distribution (Fig. 53). The known range of this species extends from India eastward in the Indo-Australian Archipelago to Solomon Islands. In the Philippine Archipelago, this species is known from the three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: UPLB, Los Banos, Laguna; MMSU, Batac, Ilocos Norte; Hiwacloy, Goa, Camarines Sur; Visayas: VISCA, Baybay, Leyte; Mindanao: Agko, Mt. Apo; Mlang, North Cotabato. INDONESIA: Java; Sumatra. NEW GUINEA. JAPAN. TAIWAN. INDIA. AUSTRALIA. CAROLINE IS. PALAU. NEW GUINEA. SOLOMON IS.

Hosts. *Rosa* sp., *Gardenia* sp., *Premna integrifolia*, *Ervatamia pandacaqui*, silk of *Zea mays*, *Plumiera acutifolia*, *Helianthus annuus*, flower of unknown plant, *Nelumbium speciosum*, "anubing tree", *Cajanus cajan*, *Citrus* sp., on Compositae, flowers of *Lantana* sp., flowers of *Mallotus moluccanus*, flowers, flowers of *Clerodendron fragrans*, herb, flowers of *Beaumontia multiflora*

Thrips morindae Priesner

Thrips (*Thrips*) *morindae* Priesner, 1934: 275-276.
Syntype female, Indonesia: Java (SMFG)[examined]

Diagnosis. Body brown. Head wider than long. Antennae 7-segmented; segments I and II brown, pale at apex; III yellow; IV to V yellow, brown at apex; segment VI to VII greyish brown. Legs yellowish. Forewings brown with pale subbasal area; anterior vein of forewing with 4 or 5 distal setae. Metascutum reticulate. Abdominal sternites without accessory setae. This is the first record of *T. morindae* in the Philippines.

Female macroptera. Head wider than long; transversely striate posteriorly. Eyes slightly prolonged ventrally. Interocellar setae placed within ocellar triangle, immediately behind foreocellus. Postocular setae pair I and II prominent; pair I longer. Antennae 7-segmented; segments I and II brown, II pale at apex; III yellow; IV and V yellow, brown at apex; VI to VII greyish brown; segments III and IV each with forked sense cone. Mouthcone elongate, rounded.

Pronotum setose; posteromarginal setae mesad angulars 3 pairs; posteroangular setae prominent, subequal. Legs yellowish; hindtibiae with 2 spine-like setae at apex; tarsi yellow. Forewings brown, with pale subbasal area; anterior vein with 4 or 5 distal setae. Meso and metanotal sculpture reticulate, reticules with wrinkles; median setae placed behind anterior margin.

Abdominal tergites IX and X with apical setae long, pointed at apex. Sternites without accessory setae. Sternite VII with median pair of setae before posterior margin.

Male macroptera. Similar to female in structure. Body bicolored; head brown, thorax yellowish, abdomen dark brown. Abdominal sternites III to VII each with transverse glandular area.

Material examined. 3 females, Bicol Expt. Sta., Pili, Camarines Sur, on flower of unknown tree, 5-VI-1987, C. P. Reyes; 9 females, Sipit Saburan, Puerto Gallera, Oriental, Mindoro, on leaves of *Musa* sp., 20-VI-1987, C. P. Reyes; 3 females, on Rubiaceae, 20-

VI-1987, C. P. Reyes; 1 female, on *Citrus* sp., 19-VI-1987, C. P. Reyes; 1 male, on *Saccharum officinarum*, 20-VI-1987, C. P. Reyes; 1 male, VISCA, Baybay, Leyte, on arrow root plant, 13-V-1987, C. P. Reyes; 3 females, 7 males, Agko, Mt. Apo, North Cotabato, on flower of unknown plant, 5-V-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 53). The known range of this species extends from the Philippines to the Indonesian Archipelago. In the Philippines, this species is known from the three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: Bicol Expt. Sta, Pili, Camarines Sur; Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro; VISCA, Baybay, Leyte; Mindanao: Agko, Mt. Apo. INDONESIA.

Hosts. flower of unknown tree, leaves of *Musa* sp., Rubiaceae, *Citrus* sp., *Saccharum officinarum*, arrow root plant, flowers of *Morinda citrifolia*

Thrips nigropilosus Uzel
Thrips nigropilosus Uzel,1895:198.
Holotype female, Czechoslovakia:Bohemia (**?Vienna**) [not examined]

Diagnosis. Body yellow, with greyish blotches on thorax and abdominal tergites. Head wider than long. Antennae 7-segmented; segment I whitish; II to VII brown. Legs yellowish. Forewings brown, with pale base; anterior vein with 3 distal setae. Metanotum transversely striate. Abdominal tergite VIII with complete comb of long microtrichia on posterior margin. Sternites without accessory setae.

This is the first record of *T. nigropilosus* in the Philippines. This species is unusual in that the length of the wing is almost continuously variable in the same population, which is from macropterous to brachypterous (Mound and Walker, 1982).

Female macroptera. Head wider than long; transversely striate posteriorly. Interocellar setae well developed, outside ocellar triangle. Postocular setae pair I longer than interocellar setae. Antennae 7-segmented; segment I whitish; II to VII brown. Mouthcone elongate, rounded.

Pronotum moderately setose; setae fairly long with well developed pair of anteromarginal setae; posteromarginal setae mesad angulars 3 pairs, inner pair longest; posteroangular setae with inner pair slightly longer than outer pair. Legs yellowish. Forewings shaded with brown, base pale; anterior vein with 3 distal setae; posterior fringe cilia wavy. Mesonotum with faint transverse striae medially. Metanotum transversely striate on anterior third, longitudinally striate on posterior two-thirds; median setae behind anterior margin.

Abdominal tergite II with 4 pairs of lateral setae. Tergite VIII with complete comb of long microtrichia on posterior margin. Sternites without accessory setae. Sternite VII with median pair of setae before posterior margin.

Male macroptera. Similar to female in structure but more pale. Males are rare in nature but have been recorded from Europe and North America (Mound and Walker, 1982). Not yet known from the Philippines.

Material examined. 1 female, Putinglupa, Calamba, Laguna, on *Cajanus cajan*, 5-II-1983, C. P. Reyes; 2 females, VISCA, Baybay, Leyte, on African daisy, 4-V-1983, C. P. Reyes (**CPRC**).

Distribution (Fig. 53). The known range of this species extends from Europe, Africa eastward in Asia to the New Zealand and northward to North America. In the Philippine Archipelago, this species is known from the islands of Luzon and Visayas.

PHILIPPINES: Luzon: Putinglupa, Calamba Laguna; Visayas: VISCA, Baybay, Leyte. CENTRAL ASIA. JAPAN. AUSTRALIA. NEW ZEALAND. FIJI. U.S.A.: Hawaii; Iowa; Virginia; California; Illinois; South Dakota; New York; Washington; Indiana; New Jersey; Georgia. EASTERN AFRICA. TURKEY. EGYPT. TRANSCAUCASEI. LITHUANIA. GERMANY. U.K.: England; Scotland. SWITZERLAND. FINLAND. FRANCE. DENMARK. HUNGARY. SWEDEN. NETHERLAND. RUMANIA. ALBANIA. AUSTRIA. CZECHOSLOVAKIA. POLAND. SIBERIA. ALBANIA. NETHERLANDS. RUMANIA. RUSSIA.

Hosts. *Cajanus cajan*, African daisy, various flowers especially of Compositae. *T. nigropilosus* is also known as "Chrysanthemum thrips" (Stannard,1968).

***Thrips orientalis* (Bagnall)**
Isoneurothrips orientalis Bagnall, 1915: 593.
Lectotype female, Malaysia: Sarawak, Matang (**TMNH**)[examined]

Diagnosis. Body dark brown. Head about as long as wide or slightly longer. Antennae 7-segmented; segments I and II and V to VII brown; segment III yellowish white tinged with grey to light brown; IV brownish but greyish at base, Femora, mid and hindtibiae brown; foretibiae yellow, lateral margins brownish; tarsi yellow. Forewings uniformly greyish brown; anterior vein with nearly complete row of setae or with short gap just after basal setae 7. Metascutum reticulate. Abdominal tergite VIII with sparse, fine comb of microtrichia on posterior margin interrupted medially. Sternites without or with 2 pairs of accessory setae.

This is the first record of *T. orientalis* in the Philippines. Adults of this species are difficult to separate from those of other species having the *orientalis* -type of metascutal sculpture (represented in the Philippines by *T. malloti*, *T. morindae*, and *T. parvispinus*). In this paper, specimens of these species are treated as distinct, however, a revisionary work on this group might prove otherwise.

Female macroptera. Head about as long as wide or longer; transversely striate posteriorly. Interocellar setae placed immediately behind foreocellus inside ocellar triangle. Postocular setae pair I prominent. Antennae 7-segmented, slender, about 2.2 times as long as head; segment III yellowish white, tinged with grey to light brown; IV brownish, greyish at base; I, II and V to VII brown. Mouthcone elongate, rounded.

Pronotum quadrate; barely longer than head; posteromarginal setae mesad angulars 3 pairs; posteroangular setae prominent, subequal. Femora brown; foretibiae yellow, lateral margins brownish; mid and hindtibiae brown; tarsi yellow. Forewings uniformly greyish brown; preapical seta long; anterior vein with nearly complete row of setae, or with short gap just after basal setae 7. Mesonotum transversely striate. Metascutum reticulate; reticules with internal wrinkles; median setae placed behind anterior margin.

Abdominal tergite II with 3 lateral setae. Tergite VIII with sparse, fine comb of microtrichia on posterior margin interrupted medially. Tergites IX and X with apical setae dark, well developed. Abdominal sternites without or with 2 pairs of accessory setae; sternite VII with median pair of posteromarginal setae before posterior margin.

Male macroptera. Similar to female in structure and color. Abdominal tergite IX with pair of stout, black, apical setae with blunt apices. Sternites III to VII each with transverse glandular area.

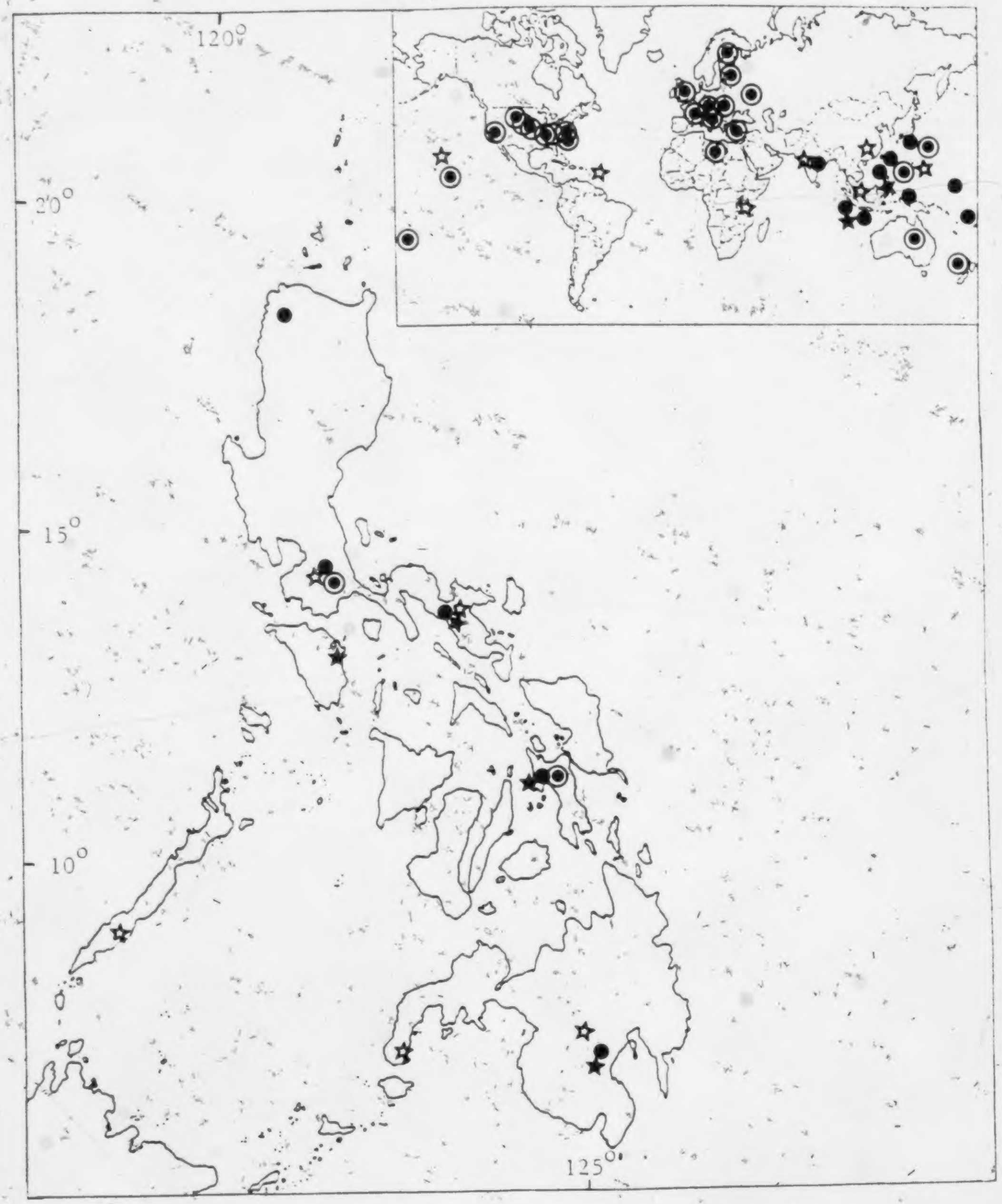
Material examined. 4 females, IRRI, Los Banos, Laguna, on *Jasminum sambac*, 8-VIII-1982, C. P. Reyes; 1 female, 1 male, on *Jasminum sambac*, 4-X-1983, M. Ma; 3 females, 1 male, Bicol Expt. Sta., Pili, Camarines Sur, on flower of *Jasminum* sp., 4-VI-1987, C. P. Reyes; 2 females, Brooks Point, Palawan, on *Jasminum sambac*, 30-I-1985, C. P. Reyes; 1 female, Mt. Pangasugan, Baybay, Leyte, host unknown, 4-V-1983, C. P. Reyes; 4 females,1 male, on flower of "manban", 4-V-1983, C. P. Reyes; 1 female, Pasonanca Park, Zamboanga City, on flower of Amyrallidaceae, 13-VII-1987, C. P. Reyes; 2 females, Mlang, North Cotabato, on *Jasminum sambac*, 18-II-1985, C. P. Reyes (**CPRC**).

Distribution (Fig. 53). The known range of this species extends from Tanzania eastward in India to the Pacific Islands and northward to the Lesser Antilles. In the Philippines, this species is known from the four principal zoogeographic regions, on the islands of Luzon, Palawan, Visayas and Mindanao. PHILIPPINES: Luzon: IRRI, Los Banos, Laguna; Bicol Expt. Sta., Pili, Camarines Sur; Palawan: Brooks Point; Visayas: Mt. Pangasugan, Baybay, Leyte; Mindanao: Pasonanca Park, Zamboanga; Mlang, North Cotabato. MALAYSIA: Kuala Lumpur, Sarawak, Borneo. THAILAND. INDONESIA: Java. INDIA. CHINA. U.S.A.: Hawaii. LESSER ANTILLES. TANZANIA.

Hosts. flowers of *Jasminum sambac*, *Jasminum* sp., flower of "manban", flowers of Amyrallidaceae, *Morinda tinctoria*; *Oleaceae jasmium*; *Gardenia* sp., *Jasminum mesnyi*, *Jasminum indicum* , *Canthium* sp., white flowers, flowers of *Morinda tinctoria*, flowers of *Plumiera* sp., flowers of *Jasminum multiflorum*, flowers of *Jasminum azoricum* , flowers of *Jasminvm* spp.

Fig. 53. Distribution of *Thrips malloti* (Priesner), *Thrips morindae* Priesner, *Thrips nigropilosus* Uzel and *Thrips orientalis* (Bagnall) in the Philippines, and world.

- ● *T. malloti* (Priesner)
- ★ *T. morindae* Priesner
- ◉ *T. nigropilosus* Uzel
- ☆ *T. orientalis* (Bagnall)


120°
20°
15°
10°
125°

***Thrips palmerae*, n.sp.**
Holotype female, Philippines: Agko, Mt. Apo (**UPLB**)
Figure 54a, b, c, d, e

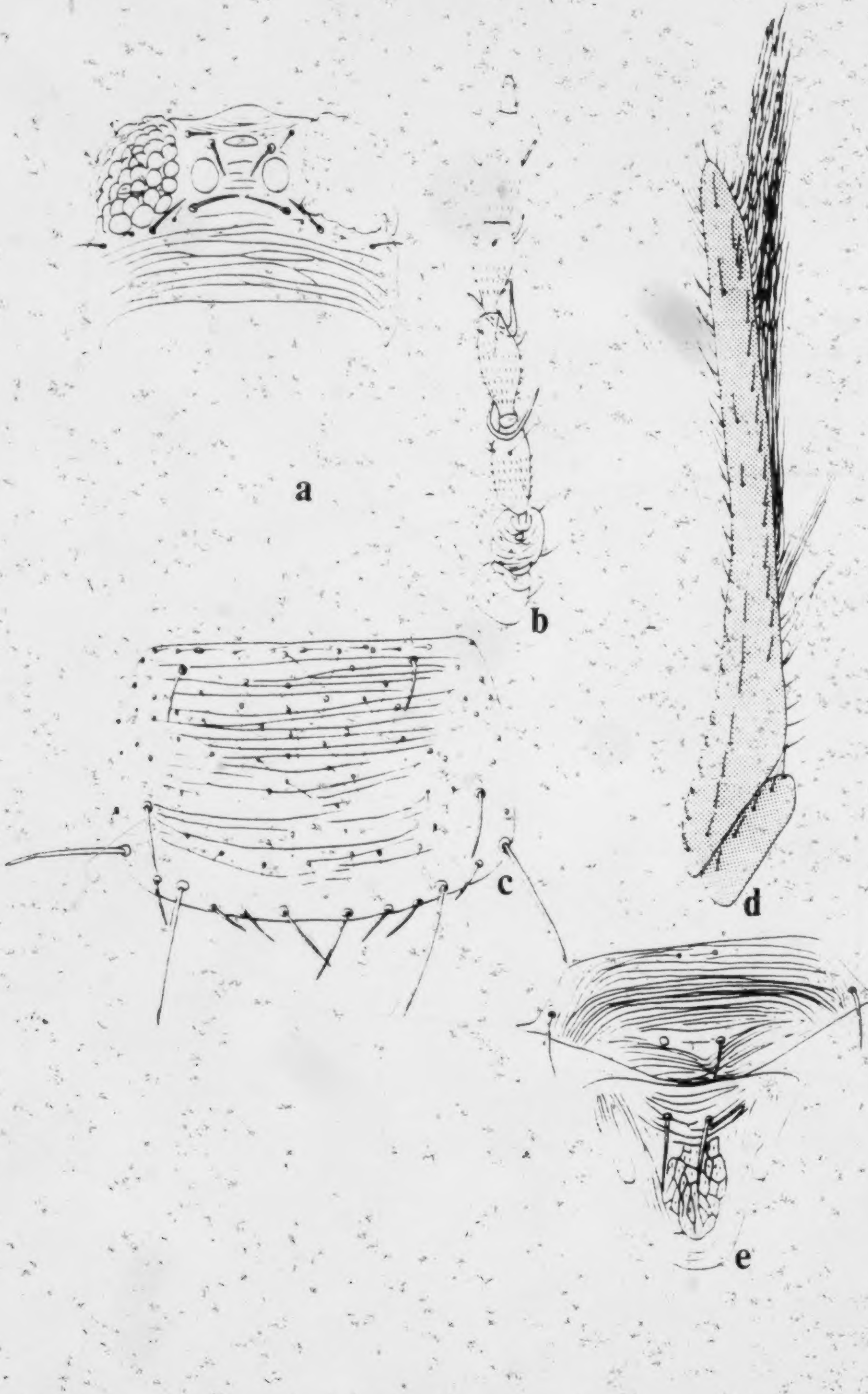
Diagnosis. Body brown. Head wider than long. Interocellar placed outside ocellar triangle. Postocular setae pair I and III conspicuous. Antennae 7-segmented; segment III light brown. Pronotum setose; posteroangular setae subequal. Legs and wings brown; anterior vein with 4 distal setae. Metascutum transversely striate on anterior third, longitudinally reticulate on posterior two-thirds; reticules with wrinkles; median setae behind anterior margin. Abdominal sternites V-VI each with 6 pairs of accessory setae; VII with 8 pairs of accessory setae.

Adults of this species resemble those of thrips with an *orientalis*-type of metascutal sculpture but differ in having transverse striae on the anterior third of the metascutum, reticulate sculpture confined only on posterior two-thirds, abdominal sternites V-VI each with 6 pairs of accessory setae, those of VII with 8 pairs, and forewings with 4 distal setae.

Female macroptera. Head wider than long; transversely striate posteriorly (Fig. 54a). Interocellar setae placed outside ocellar triangle. Eyes about one-third of head length. Postocular setae pair I and III conspicuous. Antennae 7-segmented, brown; segment III light brown; segments III and IV each with forked sense cone (Fig. 54b). Ventral surface of head with 6 pairs of well developed setae. Mouthcone rounded (Fig. 54a).

Pronotum setose; posteromarginal setae mesad posteroangulars 3 pairs; posteroangular setae subequal (Fig. 54c). Legs uniformly light brown; hindtibiae with spine-like setae on inner margins. Forewings shaded with brown; anterior vein with 7 basal and 4 distal setae; posterior vein with 15 setae; posterior fringe cilia wavy (Fig. 54d). Mesonotum transversely striate, with moderately stout setae. Metascutum transversely striate on anterior third, longitudinally reticulate on posterior two-thirds; reticules with internal wrinkles; median setae placed behind anterior margin; pair of campaniform sensilla

Fig. 54. *Thrips palmerae*, n. sp., female holotype. a. Head b. Right antenna c. Pronotum d. Forewing e. Meso and metascutal sculpture


a
b
c
d
e

absent (Fig. 54e).

Abdominal tergite VII with median setae inserted anterior of posterior margin. Posterior margin of tergite VIII with sparse, fine microtrichia laterally. B1 and B2 setae of tergites IX and X well developed and dark. Tergite X not completely divided longitudinally. Sternites V to VI each with 6 pairs of accessory setae; sternite VII with 8 pairs.

Dimensions (holotype female; um): Body length (extended) 1217.2. Head length 85, median width 136; interocellar setae length 22.1; postocular setae length 25.5; dorsal eye length 51; antennal segments length: I 20.4; II 28.9; III 44.2 IV 44.2; V 37.4; VI 45.9; VII 13.6. Pronotum length 115.6, median width 171.7, major setae: pm I 28.9; pa I 57.8; pa II 54.4.

Male. Unknown.

Type data. **Holotype** female, PHILIPPINES: Mindanao: Agko, Mt. Apo, on flowers of unknown plant, 5-V-1987, C. P. Reyes (**UPLB**). **Paratypes** (3 females) same data as holotype (**UPLB**).

Material examined. Type series only (**UPLB**)

Etymology. This species is named after Ms. Jennifer Palmer who kindly shared her expertise on *Thrips* during my visits to TMNH.

Distribution (Fig. 55). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo.

Host. flowers of unknown plant

Thrips palmi Karny
Thrips palmi Karny,1925a: 10-15.
Lectotype female, Indonesia: Sumatra (SMFG)[examined]
Thrips palmi Karny; Calilung, 1977: 353.
Thrips palmi Karny; Bournier, 1987: 418.

Diagnosis. Body pale yellow with dark body setae. Head wider than long. Interocellar setae placed outside ocellar triangle. Antennae 7-segmented; segments I and II whitish; III light brown; IV to V variable; segment VI to VII brown. Pronotum setose. Legs and forewings yellow; anterior vein with 3 distal setae. Metascutum transversely striate medially on anterior quarter; longitudinally striate on posterior three-quarters. Abdominal tergite VIII with complete comb of long microtrichia on posterior margin. Sternites without accessory setae.

Female macroptera. Head wider than long; transversely striate posteriorly. Interocellar setae outside ocellar triangle. Postocular setae well developed; pair I longest. Antennae 7-segmented; segments I and II whitish; III light brown but pale on basal third; IV to V variable, brown to dark brown or yellow in proximal half; VI dark brown; VII brown; segments III and IV each with forked sense cone; major inner sense cone on segment VI reaching beyond apex of segment. Mouthcone elongate, rounded.

Pronotum setose; discal setae developed; posteromarginal setae mesad major angulars 3 pairs, inner pair longest; posteroangular setae with inner pair longer than outer pair. Legs yellow; hindtibiae with 4 to 5 strong setae along inner margins in addition to 3 apical setae. Forewings yellowish; anterior vein with 7 basal and 3 distal setae; posterior vein with 10 to 12 setae. Mesonotum transversely striate medially. Metascutum transversely striate medially on anterior quarter; longitudinally striate on posterior three-quarters; median setae placed behind anterior margin; campaniform sensilla present.

Abdominal tergite II with 4 lateral setae. Tergite VIII with complete comb of fairly long microtrichia on posterior margin. Laterotergites with comb of microtrichia on posterior margin. Sternites without accessory setae.

Male macroptera. Similar to female in structure. Abdominal sternites III to VII each with transverse glandular area.

Material examined. 10 females, 4 males, San Antonio, Nueva Ecija, on *Citrullus vulgaris*, 17-III-1978, H. T. Bergonia; 5 females, 5 males, on *Citrullus* sp., 27-IV-1977, I. Palacio (**TMNH**); 5 females, 1 male, IRRI, Los Banos, Laguna, 4-X-1983, C. P. Reyes; 4 females, UPLB, Laguna, on "Thai weed", 3-II-1988, C. P. Reyes; 4 females, 3 males, on flower of "chicory", 7-II-1982, C. P. Reyes; 5 females, on *Citrullus vulgaris*, 23-V-1983, I. Palacio; 5 females, 1 male, on leaves of *Luffa cylindrica*, 5-X-1983, C. P. Reyes; 3 females, on *Gossypium* sp., 28-I-1988, M. D. Malabayabas; 3 females, on *Cucumis* sp., 2-III-1988, E. C. Mituda; 5 females, 6 males, on *Solanum melongena*, 11-VII-1983; 6 females, 3 males, on *Solanum melongena*, 26-X-1982, C. P. Reyes; 1 female, 1 male, IPB, Los Banos, Laguna 24-VI-1987, C. P. Reyes; 2 females, on *Cucumis* sp., 26-X-1982; 2 females, on *Cucurbita maxima*, 17-IX-1984, C. P. Reyes; 3 females, 2 males, on leaves of *Gossypium* sp., X-1984, R. Joshi; 1 male, on *Morus alba*, 26-X-1982, C. P. Reyes; 3 females, on *Capsicum* sp., 27-I-1988, M. D. Malabayabas; 9 females, 28-1988, E. Mituda and M. D. Malabayabas; 9 females, on *Solanum melongena*, 27-III-1988, E. C. Mituda; 1 female, on leaf of *Lycopersicum lycopersicon*, 13-X-1983, C. P. Reyes; 2 females, 1 male, on *Solanum tuberosum*, 24-III-1988, E. C. Mituda; 3 females, on *Capsicum annum*, 27-I-1988, M. D. Malabayabas; 6 females, on *Capsicum annum*, 29-I-1988, E. C. Mituda; 2 females, 1 male, on radish, 3-II-1988; 4 females, Canlubang, Laguna, II-III-1988, E. C. Mituda; 5 females, on *Solanum melongena*, 11-III-1988; 6 females, P. G. Batangas, on *Citrullus vulgaris*, 4-IV-1988; 6 females, on *Chrysanthemum* sp., 4-IV-1988, E. C. Mituda; 4 females, Sta. Lucia, Mt. Banahaw, Quezon, on *Solanum tuberosum*, 4-III-1988, E. C. Mituda; 7 females, Pili, Camarines Sur, on *Solanum melongena*, 8-III-1988, C. P. Reyes; 1 female, Hiwacloy, Goa, Camarines Sur, on *Solanum* sp. 18-V-1987, C. P. Reyes; 2 females, Batac, Ilocos Norte, on *Cucurbita maxima*, 7-II-1988, E. C. Mituda; 5 females, 1 male, CLSU, Munoz, Nueva

Ecija, 15-II-1988, M. D. Malabayabas; 2 females, Carosucan, Asingan, Pangasinan, on *Nicotiana tabacum*, 11-II-1988; 4 females, on *Lycopersicum lycopersicon*, II-II-1988, E. C. Mituda; 1 female, MSAC, La Trinidad, Mt. Province, on *Hibiscus rosa-sinensis*, 8-XII-1984, C. P. Reyes; 3 females, 1 male, Jones, Isabela, on potato, 1-III-1988, E. C. Mituda; 1 female, Bacnotan, La Union, on *Solanum melongena*, 11-II-1988, E. C. Mituda; 11 females, 7 males, Pina, Guimaras, on *Vigna sinensis*, 22-V-1987; 11 females, 4 males, on *Cucurbita maxima*, 22-V-1987; 2 females, on "Okra", 22-V-1987; 2 females, 1 male, on *Lycopersicum lycopersicon*, 22-V-1987; 2 females, on *Capsicum* sp., 22-V-1987, C. P. Reyes; 3 females, VISCA, Baybay, Leyte, on *Vigna sinensis*, 5-V-1983; 1 female, on flower of *Phaseolus vulgaris*, 5-V-1983; 1 male, on *Lantana*, 4-V-1983; 1 female, host unknown, 10-VIII-1983; 1 male, on *Zea mays* tassel, 12-V-1987, C. P. Reyes; 1 male, Sipit Saburan, Puerto Gallera, Oriental Mindoro, on unknown tree, 19-VI-1987, C. P. Reyes; 4 females, Musuan, Bukidnon, on *Luffa cylindrica*, 22-VII-1988, E. C. Mituda; 7 females, Malaybalay, Bukidnon, 20-VII-1988, E. C. Mituda; 10 females, Dalwangan, Malaybalay, Bukidnon, on *Capsicum* sp., 20-VII-1988; 10 females, 1 male, on *Solanum tuberosum*, 20-VII-1988, E. C. Mituda; 9 females, 2 males, CMU, Musuan, Bukidnon on *Solanum melongena*, 22-VII-1988, E. C. Mituda;7 females, 1 male, Davao Expt. Sta., Bago-Oshiro, Davao City, 16-VII-1988, E. C. Mituda; 1 male, TADECO, Panabo, Davao del Norte, on *Solanum melongena*, 26-VI-1985, E. Oquias; 12 females, Langgal, Bagumbayan, Sultan Kudarat, on *Solanum melongena*, 12-VII-1988, E. C. Mituda; 1 male, Mlang, North Cotabato, on *Cucurbita maxima*, 18-II-1985, C. P. Reyes; 1 female, Bagontapay, Mlang, North Cotabato, on flowers of "tuba"; 10-V-1987, C. P. Reyes(**CPRC**); 1 female, taken in quarantine at Seattle, Washington, on cut flowers, 14-V-1968, R. F. Boodal (**USNM**).

Distribution (Fig. 55). The known range of this species extends from Sudan eastward in India to the Indonesian Archipelago. In the Philippine Archipelago, this species is known from three principal zoogeographic regions, on the islands of Luzon, Visayas and

Mindanao. PHILIPPINES: Luzon: Manila, taken in quarantine at Seattle, Washington; Visayas; Mindanao. INDONESIA: Sumatra, Java. MALAYSIA. SINGAPORE. HONGKONG. THAILAND. JAPAN. TAIWAN. INDIA. PAKISTAN. BANGLADESH. SUDAN.

Hosts. During my collecting trips to different places in the country, I found this species usually associated with solanaceous and leguminous plants. In Jordan, Guimaras, *T. palmi* almost wiped out all watermelon plants, and infested all other plants planted in the same area. Similar severe infestations on watermelon plants in Pampanga and in Laguna were brought to my attention. On the UPLB campus alone, I was able to collect hundreds of adults and immatures on eggplants in the Agronomy area. In 1980, Bhatti (1980b) reported *T. palmi* to be a serious pest of peas in the Philippines.

Thrips parvispinus **(Karny)**
Isoneurothrips parvispinus Karny, 1922a: 106.
Thrips (Isothrips) parvispinus (Karny); Jacot-Guillarmod, 1975: 1081.
Lectotype female, Thailand: Bangkok (**SMFG**)[examined]

Diagnosis. Body brown. Head wider than long. Antennae 7-segmented; segments I and II brown; III yellow; IV brown with pale base; V to VII brown. Forelegs yellow; mid and hindfemora brown with pale apices. Forewings brown, basal third pale; anterior vein with complete row of setae. Abdominal tergite VIII without comb of microtrichia on posterior margin. Sternite IV with 5 pairs of accessory setae; sternite VII without accessory setae. This is the first record of *T. parvispinus* in the Philippines.

Female macroptera. Head wider than long; transversely striate posteriorly. Interocellar setae long, placed within ocellar triangle. Postocular setae pair I well developed. Antennae 7-segmented; segments I and II brown; III yellow, longer than IV; IV brown with pale base; V to VII brown; segments III and IV each with forked sense cone. Mouthcone elongate, rounded.

Pronotum transversely striate; setose; with 3 pairs of posteromarginal setae mesad angulars; posteroangular setae well developed, subequal. Forelegs yellow; mid and hindfemora brown with pale apices; tibiae yellow. Forewings brown, basal third pale; anterior vein with complete row of setae; posterior fringe cilia wavy; scale light brown. Mesonotum with transverse striae medially. Metanotum reticulate medially; median setae placed near anterior margin.

Abdominal tergite VIII without comb of microtrichia on posterior margin. Tergites IX and X with long, dark, apical setae, pointed at apex. Sternite IV with 5 pairs of accessory setae. Sternite VII without accessory setae.

Male. ?Unknown.

Material examined. 1 female, UPLB, Los Banos, Laguna, on *Citrullus vulgaris*, 18-IV-1984, E. Mituda; 8 females, 2-III-1988, E. C. Mituda; 1 female, Aborlan, Palawan, on flower of unknown plant, 25-II-1987, V. Fernando (**CPRC**).

Distribution (Fig. 55). The known range of this species extends from Thailand eastward in the Indonesian Archipelago to Australia. In the Philippine Archipelago, this species is known from the islands of Luzon and Palawan. PHILIPPINES: Luzon: UPLB, Los Banos, Laguna; Palawan: Aborlan. THAILAND. INDONESIA: Sumatra; Java; Krakatua; Sebesi. PAPUA NEW GUINEA. AUSTRALIA: Queensland.

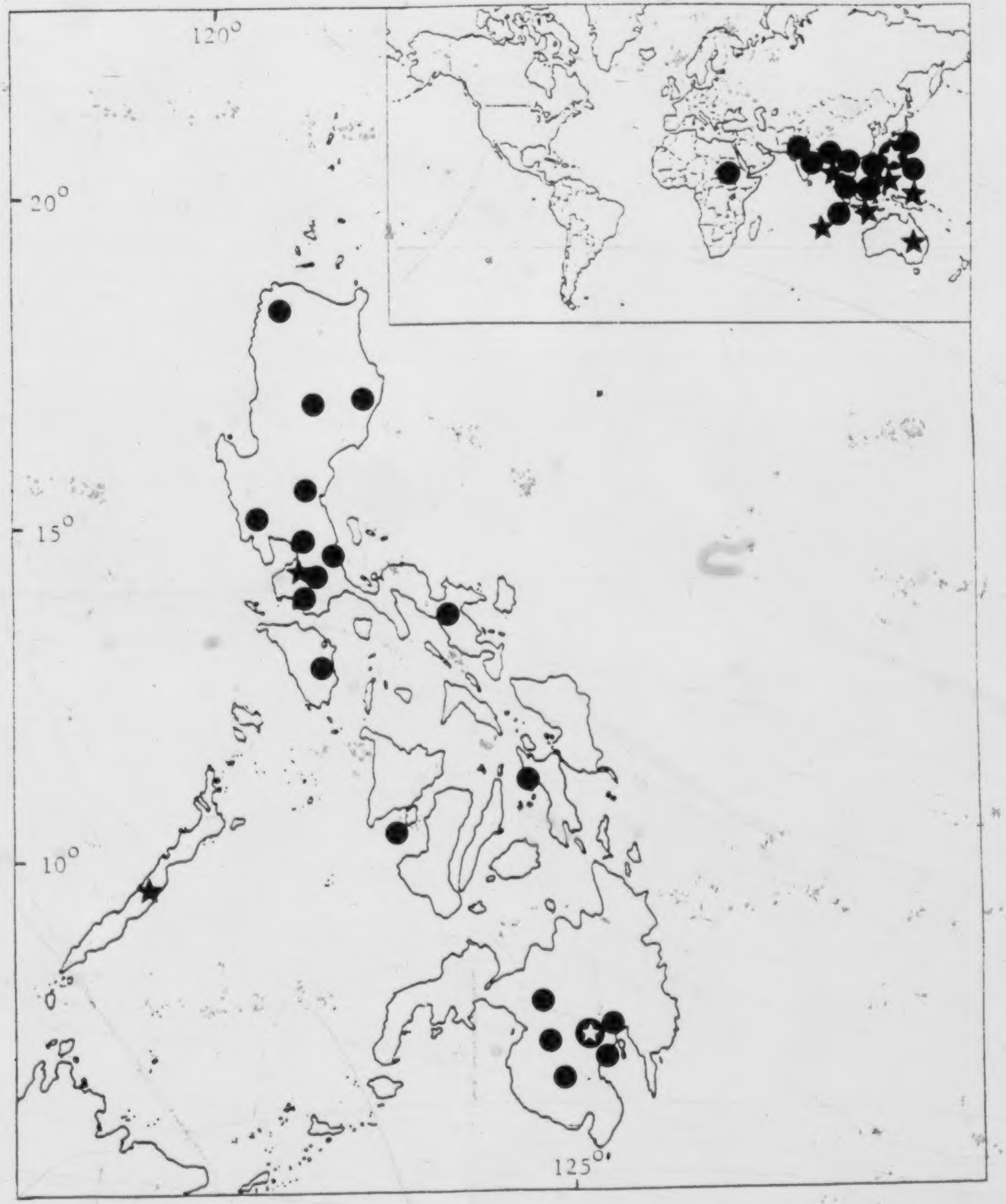
Hosts. *Citrullus vulgaris*, flower of unknown plant, *Trichosanthes tricuspidata*, *Nicotiana tabacum*, *Bidens pilosa*, *Allamanda cathartica*, *Datura* sp., *Impatiens balsamina*, *Coffea* sp., *Petroselinum* sp., *Crotolaria saltiana*, *Ipomoea brasiliensis*, *Bauhinia tomentosa*, *Pavetta indica*, *Tabernaemontana* sp., *Ischaemum muticum*, *Vigna* sp., *Capsicum annum*, *Cucumis* sp.

Fig. 55. Distribution of *Thrips palmerae*, n. sp., *Thrips palmi* Karny and *Thrips parvispinus* (Karny) in the Philippines, and world.

✪ *T. palmerae*, n. sp.

● *T. palmi* Karny

★ *T. parvispinus* (Karny)


120°
20°
15°
10°
125°

Thrips simplex **(Morison)**
Physothrips simplex Morison,1930:12.
Taeniothrips (*Taeniothrips*) *simplex* (Morison); Jacot-Guillarmod, 1975: 1048.
Holotype female, Australia: Urrbrae, South Australia (**TMNH**)[examined]

Diagnosis. Body dark brown with yellow to orange subintegumental pigment. Head about as long as wide or slightly longer. Interocellar setae inside ocellar triangle. Antennae 8-segmented predominantly brown except segment III yellow to yellowish brown. Pronotum with few discal setae. Legs predominantly brown. Forewings brown; basal quarter pale; anterior vein with 4 or 5 distal setae. Metascutum reticulate; reticules with internal wrinkles. Abdominal tergite VIII with complete comb of microtrichia on posterior margin. Sternites III to VII with accessory setae. This is the first record of this species in the Philippines.

Female macroptera. Head about as long as wide or slightly longer; transversely striate posteriorly. Interocellar setae minute, inside ocellar triangle. Postocular setae pairs 1 and III developed. Antennae 8-segmented, predominantly brown except segment III yellow to yellowish brown. Mouthcone rounded.

Pronotum with few, short discal setae; posteromarginal setae mesad angulars well developed, 3 pairs; posteroangular setae prominent, subequal. Legs predominantly brown; apices of foretibiae and tarsi yellowish brown. Forewings brown; basal quarter pale; anterior vein with 8 or 9 basal and 4, 5 or more distal setae; posterior fringe cilia wavy. Mesonotum with closely spaced, transverse striae. Metascutal median sculpture reticulate; reticules with internal wrinkles; median setae behind anterior margin; campaniform sensilla present or absent.

Abdominal tergite VIII with complete comb of microtrichia on posterior margin. Tergites IX and X with dark, developed apical setae. Tergite X not completely divided longitudinally, anterior quarter entire. Laterotergites with rows of microtrichia. Sternites III to VII with accessory setae.

Male macroptera. Similar to female in color. Abdominal tergite VIII with or without incomplete comb of short, microtrichia on posterior margin. Sternites III to VII each with large, transverse glandular area; sternal accessory setae absent.

Material examined. 2 females, IRRI, Los Banos, Laguna, on *Plumiera acutifolia*, 4-X-1983, C. P. Reyes; 1 female, UPLB, Los Banos, Laguna, on leaf of *Ficus* sp., 5-I-1980, I. Lit Jr.; 4 females, Wright Park, Baguio City, on flowers of *Crepis japonica*, 8-XII-1984, C. P. Reyes; 12 females, MSAC, La Trinidad, Mt. Province, on Chinese lily, 8-XII-1984, Oratai and Chantana; 1 female, on *Helianthus annuus*, 8-XII-1984, C. P. Reyes; 2 females, MSAC, La Trinidad, Mt. Province, host unknown and on "chayote", 8-XII-1984, Oratai and Chantana; C. P. Reyes; 2 females, on "chayote", 8-XII-1984, C. P. Reyes; 11 females, Wright Park, Baguio City; 22 females, Baguio City, 8-XII-1984, C. P. Reyes; 10 females, on *Hibiscus rosa-sinensis*, 8-XII-1984, C. P. Reyes; 9 females, Mt. Apo, on *Crinium asiaticum*, 16-IV-1983, C. P. Reyes; 1 female, Mt. Apo, on African daisy, 16-IV-1983, C. P. Reyes (**CPRC**).

Distribution. This species has a cosmopolitan distribution. In the Philippine Archipelago, this species is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: UPLB and IRRI, Los Banos, Laguna; Wright Park, Baguio City; MSAC, La Trinidad, Mt. Province; Mindanao: Mt. Apo.

Hosts. *Plumiera acutifolia*, leaf of *Ficus* sp., flowers of *Crepis japonica*, Chinese lily, *Helianthus annuus*, "chayote", *Hibiscus rosa-sinensis*, *Crinium asiaticum*, African daisy, flowers of carnation, Hanab Turki vine, *Gladiolus hybridus*, *Gladiolus* sp., on iridaceous plants. *T. simplex* is also known as *Gladiolus* thrips and is a major pest of commercially grown *Gladiolus* throughout the world.

Thrips subnudula (Karny)
Ramaswamiahiella subnudula Karny,1926: 208-230.
Syntypes male, female, India: Coimbatore (**SMFG**) [examined]

Diagnosis. Body yellowish to orange yellow. Head about as long as wide or longer. Interocellar setae placed inside ocellar triangle. Antennae 7-segmented; predominantly greyish brown except segment I whitish and II yellowish. Pronotum setose. Legs yellow. Forewings greyish yellow; anterior vein with 3 distal setae. Metascutum reticulate medially, anterior fifth with transverse striae. Abdominal tergite VIII with lateral, sparse comb of microtrichia on posterior margin. Sternites with numerous accessory setae. This is the first record of *T. subnudula* in the Philippines.

Female macroptera. Head about as long as wide or longer; transversely striate posteriorly. Interocellar setae placed within ocellar triangle. Postocular setae well developed. Antennae 7-segmented; segment I whitish; II yellowish; III light brown; IV and V greyish with pale bases; VI and VII greyish or brownish; segment III pedicellate; segments III and IV each with short, forked sense cone. Mouthcone elongate, rounded.

Pronotum setose; discal setae well developed; posteromarginal setae mesad angulars well developed, 3 pairs; posteroangular setae longer than posteromarginals . Legs yellow; forefemora slightly enlarged. Forewings greyish yellow; anterior vein with 7 basal, and 3 discal setae; posterior vein with 10 to 14 setae; posterior fringe cilia wavy. Pterothorax slightly arched laterally; mesonotum transversely striate medially. Metascutum reticulate medially, anterior fifth with transverse striae; median setae placed behind anterior margin; campaniform sensilla absent.

Abdominal tergite VIII with lateral sparse comb of microtrichia on posterior margin. Tergites IX and X with well developed, shaded apical setae. Sternites with numerous accessory setae.

Male macroptera. Similar to female in structure. Setae on abdominal tergites V to VIII about half as long as its segment. Median apical setae of tergite X about 2 times as long as median apical setae on tergite IX. Abdominal sternites III to VII each with transverse glandular area.

Material examined. 1 female, UPLB, Los Banos, Laguna, on flower of *Phaseolus vulgaris*, 23-I-1985, Oratai and Chantana; 8 females, on *Amaranthus spinosus*, 14, VI-1985; 9 females, USM, Kabacan, North Cotabato, on *Amaranthus spinosus*, 18-II-1985, C. P. Reyes; 1 female, Malungon, South Cotabato, on birds of paradise plant, 23-II-1985, C. P. Reyes (**CPRC**).

Distribution (Fig. 56). The known range of this species extends from Uganda eastward in India to the Philippines. In the Philippine Archipelago, this species is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: UPLB, Los Banos, Laguna; Mindanao: USM, Kabacan, North Cotabato; Malungon, South Cotabato. BANGLADESH. INDIA. UGANDA.

Hosts. flower of *Phaseolus vulgaris*, *Amaranthus spinosus*, birds of paradise plant, flowers of *Calotropsis* sp., *Illecebrum lanatum*, flowers of *Caesalpinia pulcherrima*, *Hibiscus rosa-sinensis*, *Persea americana*, *Mangifera indica*, pomegranate, *Dolichos lablab*, *Lantana* sp., sandal shoots, *Citrus* sp., *Tamarindus indica*, *Sesamum indicum*, *Glycine max*, *Moringa oleacea*, *Citrus medica*

Thrips sumatrensis Priesner

Thrips sumatrensis Priesner,1934: 256, 285.
Holotype female, Indonesia: Sumatra (SMFG)[examined]

Diagnosis. Body brown. Head wider than long. Interocellar setae well developed outside ocellar triangle. Antennae 7-segmented; segments I, II, IV to VII brown; apex of segment II pale; segment III yellow. Pronotum with few discal setae; posteroangular setae about 4 times as long as inner pair of posteromarginal setae. Femora brownish yellow; tibiae and tarsi yellow. Forewings brown; basal quarter pale; anterior vein with 2 to 4 distal setae. Metascutum transversely striate on anterior third, longitudinally striate on posterior two-thirds. Abdominal tergite VIII with fine, long comb of microtrichia on posterior margin. Sternites with 5 to 7 pairs of accessory setae. This is the first record of *T. sumatrensis* in the Philippines.

Female macroptera. Head wider than long; striate posteriorly. Interocellar setae well developed outside ocellar triangle. Postocular setae pair I well developed. Antennae 7-segmented; segment I brown; II brown with pale apex; III yellow; IV to VII brown; III pedicellate; segments III and IV each with forked sense cone. Mouthcone elongate, rounded.

Pronotum transversely striate; discal setae few; posteromarginal setae mesad angulars 3 pairs, inner pair longest; posteroangular setae long, about 4 times as long as inner pair of posteromarginals. Femora slightly enlarged, brown with pale apices; tibiae and tarsi yellow. Forewings brown; basal quarter pale; vein setae dark, strong; anterior vein with 2 to 4 distal setae; posterior fringe cilia wavy. Mesonotum with transverse striae medially. Metascutum transversely striate on anterior third, longitudinally striate on posterior two-thirds; median setae placed near anterior margin; campaniform sensilla present.

Abdominal tergite VIII with fine, long comb of microtrichia on posterior margin. Tergites IX and X with well developed, dark apical setae. Tergite X not completely divided longitudinally, anterior quarter entire. Sternites with 5 to 7 pairs of accessory setae.

Male. ?Unknown.

Material examined. 1 female, Batac, Ilocos Norte, on *Solanum melongena*, 9-IV-1985, C. P. Reyes; 1 female, Aborlan, Palawan, on flower of unknown plant, 25-V-1987, C. P.Reyes; 1 female, Mt. Tabiey, Cabigaan, Palawan, on flower of unknown plant, 23-V-1987, V. Fernando; 7 females, VISCA, Baybay, Leyte, on flower of *Glericidia*, 12-V-1987, C. P. Reyes; 1 female, on "anubing tree", 13-V-1987, C. P. Reyes; 2 females, Malungon, South Cotabato, host unknown, 23-II-1985, C. P. Reyes;1 female, on Zingeberaceae, 23-II-1985, C. P. Reyes; 1 female, Mlang, North Cotabato, on *Areca catechu*, 17-II-1985, C. P. Reyes; 1 female, Agko, Mt. Apo, on million flower, 5-V-1987, C. P. Reyes (**CPRC**); 4 females, taken in quarantine at Seattle; Anchorage; San Francisco; Honolulu, on *Canavalia* sp., cut flowers, *Jasminum* sp., *Sesbania grandiflora*. (**USNM**).

Distribution (Fig. 56). The known range of this species extends from Thailand to nesia Archipelago. In the Philippine Archipelago, this species is known from the four principal zoogeographic regions, on the islands of Luzon, Palawan, Visayas and Mindanao. PHILIPPINES: Luzon: Manila, taken in quarantine at Seattle, Washington; Anchorage, Alaska; San Francisco, California; Honolulu, Hawaii; Batac, Ilocos Norte; Palawan: Aborlan; Mt. Tabiey, Cabigaan; Visayas: VISCA, Baybay, Leyte; Mindanao: Malungon, South Cotabato; Mlang, North Cotabato; Agko, Mt. Apo. INDONESIA: Java; Sumatra. THAILAND.

Hosts. *Canavalia* sp., cut flowers, *Jasminum* sp. *Sesbania grandiflora*, *Solanum melongena*, flower of unknown plant, flower of *Glericidia*, "anubing" tree, Zingeberaceae, *Areca catechu*, million flower, "Dahlia", *Canna* sp., *Jasminum* sp., *Mangifera indica*

Thrips tabaci Lindeman
Thrips tabaci Lindeman,1889:61.
Syntypes male, female, USSR: Bessarabia (**Unknown**) [not examined]
Thrips tabaci Lindeman; Capco, 1957: 66.

Diagnosis. Body variable in color, yellow or brown; major body setae dark. Head wider than long. Interocellar setae placed just behind foreocellus inside ocellar triangle. Antennae 7-segmented; segment I light brown; II brown; III to V yellowish brown; VI to VII greyish brown. Pronotum moderately setose. Legs yellow, moderately stout. Forewings uniformly pale grey; anterior vein usually with 4 distal setae. Metascutum longitudinally reticulate medially. Abdominal tergite VIII with comb of fine microtrichia on posterior margin. Tergite IX with only 1 pair of campaniform sensilla. Striae of pleurotergites with ciliate microtrichia.

Female macroptera. Head wider than long; transversely striate posteriorly. Interocellar setae placed just behind foreocellus, inside ocellar triangle. Postocular setae pair I prominent. Antennae 7-segmented; segment I light brown; II brown; III to V yellowish brown; VI and VII greyish brown; segments III and IV each with forked sense cone. Mouthcone elongate, rounded.

Pronotum moderately setose; anterior margin with no conspicuous setae; posteromarginal setae mesad angulars developed, 3 pairs; posteroangular setae less than 1.5 times as long as inner posteromarginals. Legs moderately stout, yellowish. Forewings uniformly pale grey; vein setae pale; anterior vein usually with 4, rarely 5 to 7 distal setae; posterior fringe cilia wavy. Mesonotum with transverse striae medially. Metascutum longitudinally reticulate medially; median setae placed behind anterior margin; campaniform sensilla absent.

Abdominal tergite II with 3 lateral setae. Tergite VIII with complete comb of long, fine microtrichia on posterior margin. Tergite IX with only 1 pair of campaniform sensilla, anterior pair absent. Striae of pleurotergites with ciliate microtrichia. Sternites without accessory setae.

Male macroptera. Similar to female in structure but more pale. Abdominal tergite VIII with short, sparse comb of microtrichia on posterior margin. Sternites III to V each with an elongate, narrow glandular area, absent on VI-VII.

Material examined. 1 female, Davao City, in trap, M. Gavarra (**TMNH**); 20 females, Batac, Ilocos Norte, on *Allium* sp. 7-II-1988, E. C. Mituda (**CPRC**).

Distribution. This species has a cosmopolitan distribution. In the Philippine Archipelago, this species is known from the islands of Luzon and Mindanao.

PHILIPPINES: Luzon: Laguna; Mindanao: Davao City.

Hosts. Contrary to reports from other countries, I found specimens of *T. tabaci* or "onion thrips" not to be widely distributed or as common as *T. hawaiiensis* and *T. palmi* in the Philippines although it has been known to infest tobacco, onion and garlic plants in the country (Capco, 1957). This species is highly polyphagous and feeds on leaves and flowers of countless angiosperms throughout the world. *T. tabaci* is also a major vector of yellow spot virus of pineapple in Hawaii and of a spotted wilt virus and streak disease of peas in India (Ananthakrishnan, 1973).

Thrips taiwanus Takahashi
Isoneurothrips pallipes Moulton, 1928: 296.
Thrips (Isoneurothrips) taiwanus Takahashi, 1936: 440.
Holotype female, Hori, Formosa (**CASC**) [examined]

Diagnosis. Body greyish brown. Head wider than long. Interocellar setae inside ocellar triangle. Antennae 7-segmented; segments I and II brown; III greyish yellow; IV and V brown, greyish yellow in basal third; VI and VII brown. Legs slender, yellow except femora greyish brown medially. Forewings brown, basal third pale; anterior vein with 4 distal setae. Metanotum reticulate. Abdominal tergites II to VIII with distinct transverse dark brown line on anterior margin. This is the first record of *T. taiwanus* in the Philippines.

Female macroptera. Head wider than long; transversely striate posteriorly. Interocellar setae placed in front of posterior ocelli inside ocellar triangle. Postocular setae pair I prominent. Antennae 7-segmented; 2.4 to 2.5 times as long as head; segments I and II brown; III greyish yellow; IV and V brown, greyish yellow in basal third; VI and VII brown. Mouthcone rounded.

Pronotum slightly wider than head; posteroangular setae well developed, subequal. Legs slender, yellow except femora greyish brown medially. Forewings brown, basal third nearly clear; anterior vein with 4 distal setae; posterior vein with 13 setae. Mesonotum broader than metanotum. Metanotum reticulate; median setae placed behind anterior margin; campaniform sensilla present or absent.

Abdominal tergites II to VIII with distinct transverse dark brown line near anterior margin. Tergite VIII with comb of microtrichia on posterior margin. Tergites IX and X with long apical setae. Tergite X completely divided longitudinally. Sternite I with row of accessory setae. Sternite IV with 4 pairs of accessory setae.

Male. Unknown.

Material examined. **Paratype** (1 female) Hori, Formosa [Taiwan], on a legume, XI-1926, R. Takahashi (Moulton Coll.) (**CASC**); 1 female, Philippines: Manila, taken in quarantine at Seattle, on cut flowers (**USNM**).

Distribution (Fig. 56). The known range of this species extends from Taiwan to the Philippine Archipelago. In the Philippines, this species is known from the island of Luzon. PHILIPPINES: Luzon: Manila, taken in quarantine at Seattle, Washington. TAIWAN.

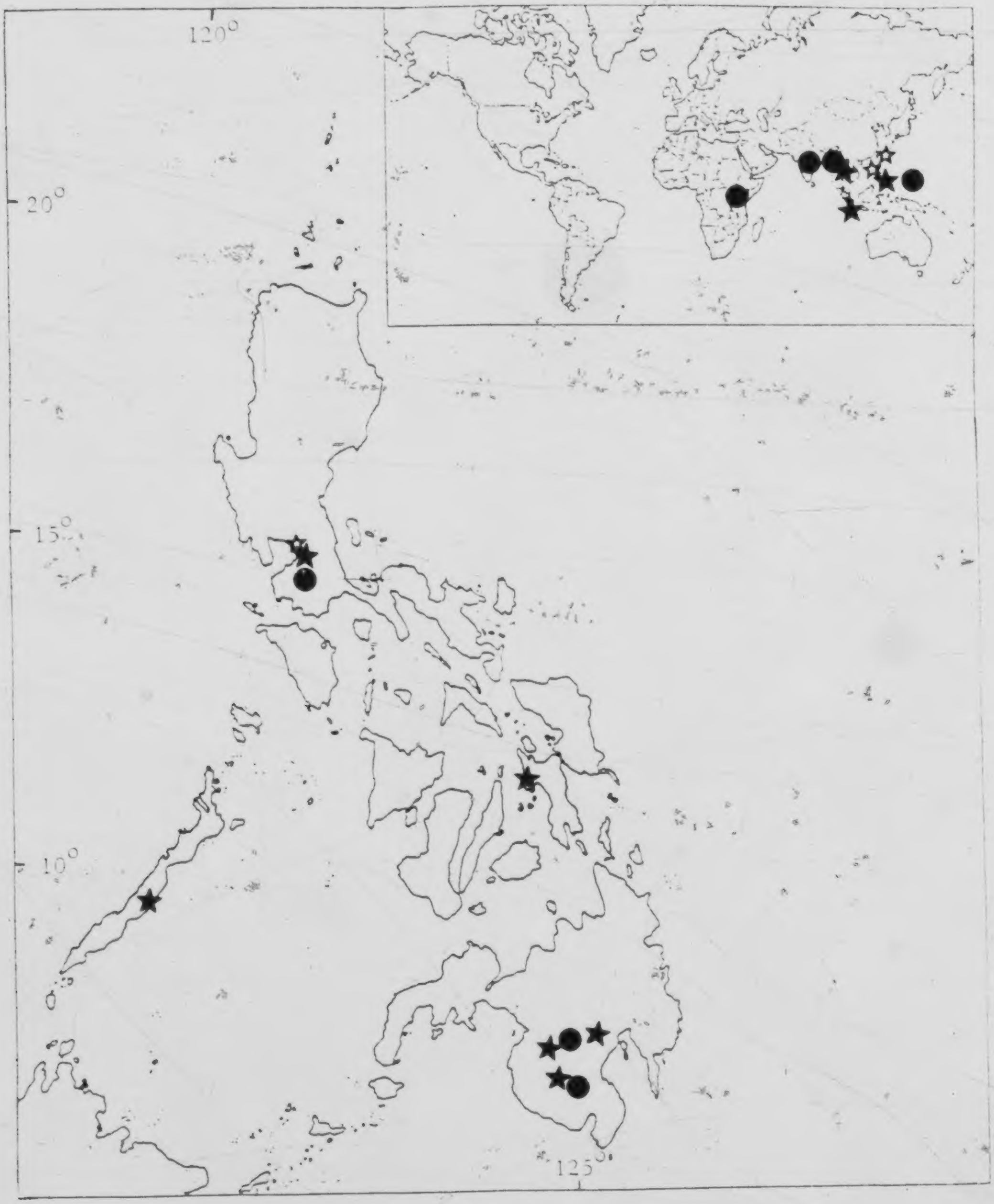
Hosts. legume, cut flowers

Fig. 56. Distribution of *Thrips subnudula* (Karny), *Thrips sumatrensis* Priesner, and *Thrips taiwanus* (Takahashi) in the Philippines, and world.

● *T. subnudula* (Karny)

★ *T. sumatrensis* Priesner

☆ *T. taiwanus* (Takahashi)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***Thrips tuscus* Moulton**
Thrips tusca Moulton,1936: 270.
Syntype female, Philippines: Victorias, Negros Occidental (CASC)[examined]

Diagnosis. Body dark brown. Head wider than long. Interocellar setae outside ocellar triangle. Antennae 7-segmented; dark brown except segments III and IV yellowish brown and light brown respectively. Femora and tibiae dark brown except bases and apices of tibiae; tarsi yellow. Forewings uniformly brown; anterior vein with 2 distal setae. Metascutum transversely striate on anterior third, longitudinally striate on posterior two-thirds. Abdominal tergite VIII with complete comb of microtrichia on posterior margin. This species is known only from the type series and these specimens are not in good condition.

Female macroptera. Head wider than long, rounded anteriorly; transversely striate posteriorly. Interocellar setae outside ocellar triangle. Postocular setae developed. Antennae 7-segmented; dark brown except segments III and IV yellowish brown and light brown respectively; segment III about as long as IV, each with forked sense cone. Mouthcone rounded.

Pronotum with 3 pairs of posteromarginal setae mesad angulars; posteroangular setae developed, subequal. Femora and tibiae dark brown except bases and apices of tibiae; tarsi yellow. Forewings uniformly brown; anterior vein with 6 basal and 2 distal setae; posterior vein with 12 setae. Metascutum transversely striate on anterior third, longitudinally striate on posterior two-thirds; median setae behind anterior margin; campaniform sensilla absent.

Abdominal tergites darker than head and thorax. Tergite VIII with complete comb of microtrichia on posterior margin. Tergites IX and X with apical setae developed.

Male macroptera. Similar to female in structure.

Material examined. **Syntypes** (3 females,1 male) PHILIPPINES: Victorias, Negros Occidental, on seedlings of *Saccharum officinarum*, 5-2-1927, W. D. Pierce (Moulton Coll.) (**CASC**).

Distribution (Fig. 57). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas, Negros Occidental.

Host. *Saccharum officinarum* seedlings.

Thrips victoriensis Moulton
Thrips victoriensis Moulton, 1936: 270.
Holotype female, Philippines: Victorias, Negros Occidental (**CASC**) [examined]

Diagnosis. Body bicolored; head, thorax, and tergites I to VII yellow, IX and X and most of VIII dark brown; body setae pale to light brown. Head wider than long. Interocellar setae outside ocellar triangle. Antennae 7-segmented; segments I and II brown; III yellow; IV to VI yellow in basal half, dark brown in apical half. Legs yellow. Forewings shaded with brown; subapex pale; anterior vein with 2 or 3 distal setae. Metascutum transversely striate on anterior third, longitudinally striate on posterior two-thirds. Abdominal tergite VIII with complete comb of microtrichia on posterior margin. This species is known only from the type material.

Female macroptera. Head wider than long, broadly rounded anteriorly. Interocellar setae shorter than postoculars, outside ocellar triangle. Postocular setae 7 pairs, well developed; pair IV longest. Cheeks slightly arched. Antennae 7-segmented; segments I and II brown; III yellow, longer than segment IV; IV to VI yellow in basal half, dark brown in apical half. Mouthcone broad.

Pronotum pale yellow; major setae well developed; posteromarginal setae mesad angulars 3 pairs; posteroangular setae subequal. Legs yellow. Forewings shaded with brown; subapex pale; veinal setae fairly long; anterior vein with 6 basal and 2 or 3 distal setae; posterior vein with 10 setae. Pterothorax pale yellow. Metascutum transversely striate on anterior third, longitudinally striate on posterior two-thirds; median setae behind anterior margin; campaniform sensilla present.

Abdominal tergites I to VII yellow. Most of tergites VIII, IX and X dark brown. Tergite VIII with complete comb of microtrichia on posterior margin. Tergite IX with B1 setae longer than those on tergite X. Tergite X with dark apical setae.

Male. Unknown

Material examined. Holotype female, PHILIPPINES: Victorias, Negros Occidental, host unknown, W. D. Pierce (Moulton Coll.) (**CASC**).

Distribution (Fig. 57). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Victorias, Negros Occidental.

Host. Unknown

***Thrips vitticornis* (Karny)**
Physothrips vitticornis Karny, 1922a: 103-106.
Taeniothrips (*Taeniothrips*) *vitticornis* (Karny); Jacot-Guillarmod, 1975: 1056.
Lectotype female, Thailand (**SMFG**)[examined]

Diagnosis. Body brown. Head wider than long. Interocellar setae outside ocellar triangle. Antennae 8-segmented; segment III pale; IV brown with pale base; I, II, V to VIII brown. Pronotum setose. Femora brown; foretibiae yellowish; mid and hindtibiae pale basally and apically; tarsi yellow. Forewings brownish; basal quarter pale; anterior vein with 4 to 7 distal setae. Metascutum transversely striate on anterior fifth; longitudinally striate on posterior four fifths. Abdominal tergite VIII with comb of fine microtrichia interrupted medially on posterior margin. Sternites with accessory setae. This is the first record of *T. vitticornis* in the Philippines.

Female macroptera. Head wider than long; posteriorly striate. Interocellar setae well developed outside ocellar triangle. Postocular setae minute. Antennae 8-segmented; segments I and II brown; III pale; IV brown with pale base; V to VIII brown; segment III and IV each with forked sense cone; segment VI more slender than segment III, with 2 long setae. Mouthcone rounded.

Pronotum setose; transversely striate; posteromarginal setae mesad angulars 3 pairs; posteroangular setae developed, subequal. Femora brown; foretibiae yellowish; mid and hindtibiae pale basally and apically; tarsi yellow. Forewings brownish; basal quarter pale; anterior vein with fourth seta of basal series distinctly longer than those before and after, with 4-7 distal setae; posterior fringe cilia wavy. Mesonotum transversely striate. Metascutum transversely striate on anterior fifth; longitudinally striate on posterior four-fifths; median setae at anterior margin; campaniform sensilla present.

Abdominal tergite VIII with comb of fine microtrichia interrupted medially on posterior margin. Tergite IX and X with long apical setae. Tergite X not completely divided longitudinally, anterior quarter entire. Sternites with accessory setae.

Male macroptera. Similar to female in structure and color. Abdominal sternites III-VII each with transverse glandular area.

Material examined. 1 female, PNAC, Aborlan, Palawan, on *Chromolaena odorata*, 25-I-1985, C. P. Reyes; 1 female, on flower of *Slericidium sepium*, 27-I-1985, C. P. Reyes; 1 female, BFD, Brooks Point , Palawan, on *Slericidium sepium*, 27-I-1987, C. P. Reyes (CPRC); 1 female, taken in quarantine at Seattle (**USNM**).

Distribution (Fig. 57). The known range of this species extends from India eastward in the Indo-Australian Archipelago, to the Pacific Islands. In the Philippine Archipelago, this species is known from the islands of Luzon and Palawan. PHILIPPINES: Luzon: Manila, taken in quarantine at Seattle, Washington; Palawan: PNAC, Aborlan; BFD, Brooks Point. INDONESIA: Java, Sumatra, Krakatau. THAILAND. VIETNAM. AUSTRALIA: Queensland. FIJI. INDIA. INDO-CHINA. TAIWAN. SAMOA. TONGA. NEW HEBRIDES. SOLOMON IS. GUAM. MARSHALL IS. VERLATEN IS. BOTEL TOBAGO. PALAU IS. MARSHALL IS. U.S.A.: Hawaii.

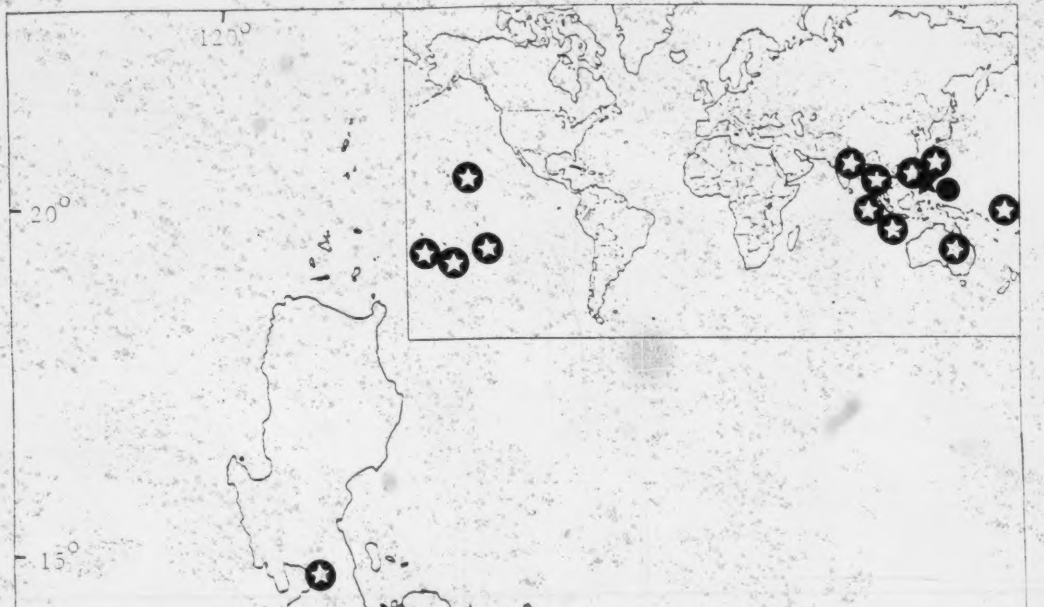
Hosts. *Chromolaena odorata*, flower of *Slericidium sepium*, *Melastoma malabathricum*, *Canavalia obtusifolia*, flowers of *Canavalia ensiformis*, flowers of *Desmodium umbellatum*, flowers of *Pongamia* sp., flowers of *Derris uliginosa*, flowers of *Cassia occidentalis*, flowers of a Papilionaceae, *legume*, flowers of *Canavalia lineata*, *Tithonia diversifolia*, *Barringtonia racemosa*, *Pongamia glabra*

Fig. 57. Distribution of *Thrips tuscus* Moulton, *Thrips victoriensis* Moulton and *Thrips vitticornis* (Karny)

★ *T. tuscus* Moulton

● *T. victoriensis* Moulton

✪ *T. vitticornis* (Karny)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Genus *Trichromothrips* Priesner

Trichromothrips Priesner, 1930b: 9
Type species: *Trichromothrips bellus* Priesner, by original designation and monotypy.

Diagnosis. Head wider than long. Ocellar setae pair I absent. Eyes relatively large, strongly protruding. Cheeks constricted behind eyes; interocellar setae long. Postocular setae well developed. Antennae 8-segmented; segments III and IV each with forked sense cone. Maxillary palpi 2- or 3- segmented. Mouthcone broadly rounded.

Pronotum with only 2 pairs of posteromarginal setae developed. Forefemora slender; tarsi 2-segmented. Macropterous, brachypterous, or apterous. Forewings when fully developed, narrow; anterior vein with series of setae broadly interrupted; posterior vein with setae uniformly spaced; posterior fringe cilia wavy. Mesosternal spinula present. Metasternal spinula absent. Metaepimeron without setae.

Abdominal tergites without microtrichia. Tergites VI and VII with setae S4 always reduced. Sternal accessory setae present or absent; posteromarginal setae on sternite VII of females inserted before posterior margin. Males with sternites III-VIII each with numerous, circular glandular areas scattered over entire surface; horn-like setae or drepanae on tergite IX of male absent, present in few taxa.

Adults of *Trichromothrips* closely resemble those of *Dorcadothrips* . The former differ from the latter only by the lack of setae on the metepimera. Setae S4 are always reduced on abdominal tergites VI and VII; all posteromarginal setae on female sternite VII are place before the posterior margin. Sternites III-VIII of males usually with numerous circular glandular areas scattered over the entire surface. This genus includes 3 species (Mound and Houston, 1987). One new species, *T. bruncurrum*, is described below from the Philippines.

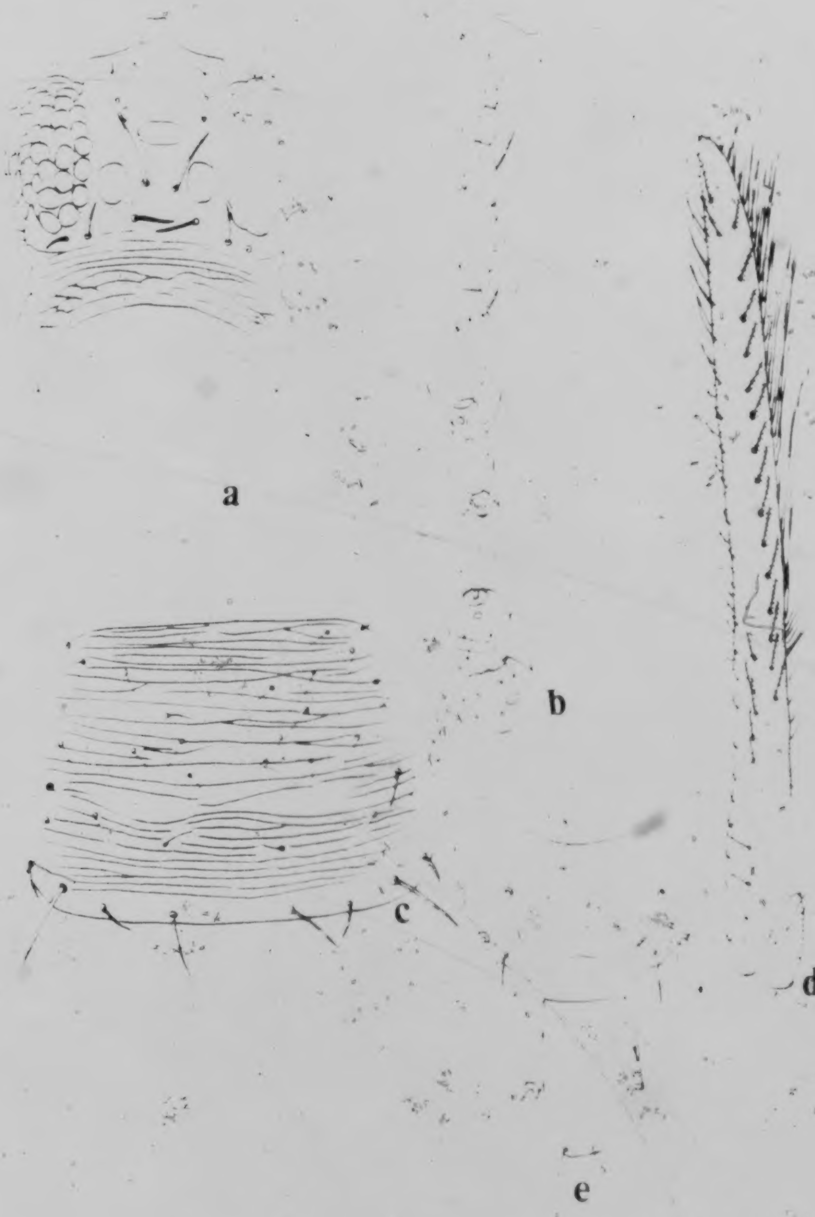
***Trichromothrips* bruncurrum, n.sp.**
Holotype male, PHILIPPINES: Luzon: Bicol Expt. Sta., Pili, Camarines Sur (UPLB)
Figure 58a, b, c, d, e

Diagnosis. Body brown. Head on posterior half and pronotum with closely spaced, transverse striae. Preocellar setae 4 to 7. Interocellar setae placed between posterior ocelli, inside ocellar triangle. Ocelli relatively large and widely spaced. Eyes protruded. Cheeks constricted medially. Antennal segments III to V yellow. Posteromarginal setae mesad angulars 2 pairs; posteroangular setae with inner pair stouter and longer than outer pair. Legs predominantly brown. Forewings brown; pale on basal quarter;anterior vein with 2 distal setae. Metanotum reticulate. Abdominal tergite IX with pair of campaniform sensilla. Tergites IX and X with horn-like processes. Sternites III to VIII each with numerous circular or oval glandular areas.

This species is placed under *Trichromothrips* because males have numerous circular glandular areas on abdominal sternites III-VIII, lack setae on the metepimera, and because setae S4 on tergites VI and VII are reduced as in other members of this genus. Adults of *T. bruncurrum*, n. sp. resemble those in *Dorcadothrips* Priesner but, at the same time differ from other known species of *Trichromothrips* in having median, horn-like processes on tergite IX; a pair of campaniform sensilla on tergite IX; 2 pairs of posteromarginal setae on the sternites; and a uniformly brown body. Males of this species resemble those of *Amomothrips* Bhatti in having at least 6 pairs of preocellar setae; no setae on the metepimeron; and in the sculpture of their meso and metascuta. Unlike most species of thrips whose females are usually best represented in the collection, all 7 specimens representing this species are male.

Male macroptera. Head longer than wide, with closely spaced transverse striae on posterior half (Fig. 58a). Vertex produced between antennal bases. Ocelli relatively large and widely spaced. Preocellar setae 4 to 7; interocellar setae well developed, placed

Fig. 58. *Trichromothrips bruncu[illegible]m* n. sp., male holotype. a. Head b. Right antenna c. Pronotum d. Forewing e. Abdominal tergite IX and X


a
b
c
d
e

between posterior ocelli. Eyes protruding, more than one-third of head length. Postocular setae developed. Cheeks strongly constricted medially. Antennal segments I and II brownish; III to V yellow; VI to VII greyish brown; segments III to VIII elongate; segment III asymmetric; segments III and IV each with forked sense cone (Fig. 58b). Mouthcone rounded (Fig. 58a).

Pronotum transversely striate; posteromarginal setae mesad angulars 2 pairs; posteroangular setae with inner pair stouter and much longer than outer pair (Fig. 58c). Legs setose; brown except tarsi yellowish. Forewings brown, pale on basal quarter; anterior vein with 2 distal setae; posterior vein with complete row of setae; posterior fringe cilia straight (Fig. 58d). Mesonotum smooth on anterior third, with transverse anastomosing striae on posterior two-thirds. Metanotum reticulate; median setae behind anterior margin. Metaepimeron without setae.

Setae S4 of abdominal tergites VI to VII reduced. Tergite IX with pair of campaniform sensilla. Tergites IX and X with stout, median setae, each borne on horn-like processes (Fig. 58e). Posteromarginal setae of sternites 2 pairs. Sternites III to VIII each with numerous circular or oval glandular areas.

Dimensions(holotype male; um). Body length (extended) 1373.6. Head length 119, median width 110.5; interocellar setae 32.3; postocular setae 20.4; antennal segments length: I 32.3; II 37.4; III 57.8; IV 57.8; V 45.9; VI 61.2; VII 15.3; VIII 20.4. Pronotum length 132.6, median width 183.6, major setae: pm I 30.6; pa I 35.7; pa II 20.4.

Type data. **Holotype** male, PHILIPPINES: Luzon: Bicol Expt. Sta., Pili, Camarines Sur, on leaves of *Ficus* sp., 5-VI-1987, C. P. Reyes (**UPLB**). **Paratypes** (6 males) same data as holotype (**UPLB**).

Female. Unknown.

Material examined. Type series only (**UPLB**).

Etymology. This species is named after two dipterists and fellow graduate students, Brian V. Brown and Dr. Douglas C. Currie, for their considerable assistance.

Distribution (Fig. 61). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Bicol Expt. Sta., Pili, Camarines Sur.

Host. leaves of *Ficus* sp.

Genus *Tusothrips* Bhatti

Tusothrips Bhatti, 1967: 16.
Type species: *Mycterothrips pseudosetiprivus* Ramakrishna and Margabandhu, by original designation and monotypy.

Diagnosis. Head wider than long. Ocellar setae pair I absent; preocellar and interocellar setae strong. Postocular setae arranged in row; pair I longer and stouter than others; pair IV rudimentary. Antennae 8 -segmented, with forked sense cone on each of segments III and IV; microtrichia present on segments III to VI. Maxillary palpi long and slender, 3-segmented. Mouthcone long, narrow, and beak-like.

Pronotum transverse; posteroangular setae well developed. Tarsi 2- segmented. Anterior vein of forewings with series of setae broadly interrupted; posterior vein setae 4; posterior fringe cilia wavy. Median pair of mesonotal setae placed far ahead of posterior margin; metascutum reticulate. Mesosternal spinula present or absent. Metasternal spinula absent.

Postmarginal flanges on abdominal tergites II-VIII and sternites II-VII of females or II-VIII of males present. Tergite X divided longitudinally. Sternite II with 2 pairs, III-VIII each with 3 pairs of posteromarginal setae. Accessory setae absent. Males with tergite IX with prominent, upraised, conical process medially, and with 2 thick, dark, spine-like setae; sternites III-VII each with rudimentary glandular area in front of and fused with the antecostal line.

Adults of *Tusothrips* species have postmarginal flanges on the abdominal tergites and sternites and 4 posterior vein setae on the forewings as in those of *Chaetanaphothrips* Priesner. They differ from the latter by lacking the enlarged, stippled area about the spiracles on abdominal tergite VIII and in having a beak-like mouthcone. This genus includes 2 species (Bhatti, 1978b), both species and two new to science, are known from the Philippines.

Key to Philippine species of *Tusothrips* Bhatti

1 Forewings with broad dark brown cross band medially; mesosternal spinula absent .... *T. sumatrensis* (Karny)

1' Forewings unbanded; with or without mesosternal spinula 2

2(1') Mesosternal spinula absent; antennal segment VII about twice as long as wide (Fig. 59b) .... *T. atrichotus*, n. sp.

2' Mesosternal spinula present; antennal segment VII about as long as wide or slightly longer than wide 3

3(2') Mouthcone long, reaching to about a third the length of the mesosternum (Fig. 60a); abdominal tergite VIII with lateral sparse microtrichia on posterior margin .... *T. immaculatus*, n. sp.

3' Mouthcone moderately long, reaching to posterior margin of prosternum; abdominal tergite VIII lacking microtrichia on posterior margin .... *T. setiprivus* (Karny)

***Tusothrips atrichotus*, n. sp.**
Holotype female, PHILIPPINES: Baybay, Leyte (**UPLB**)
Figure 59a, b, c, d

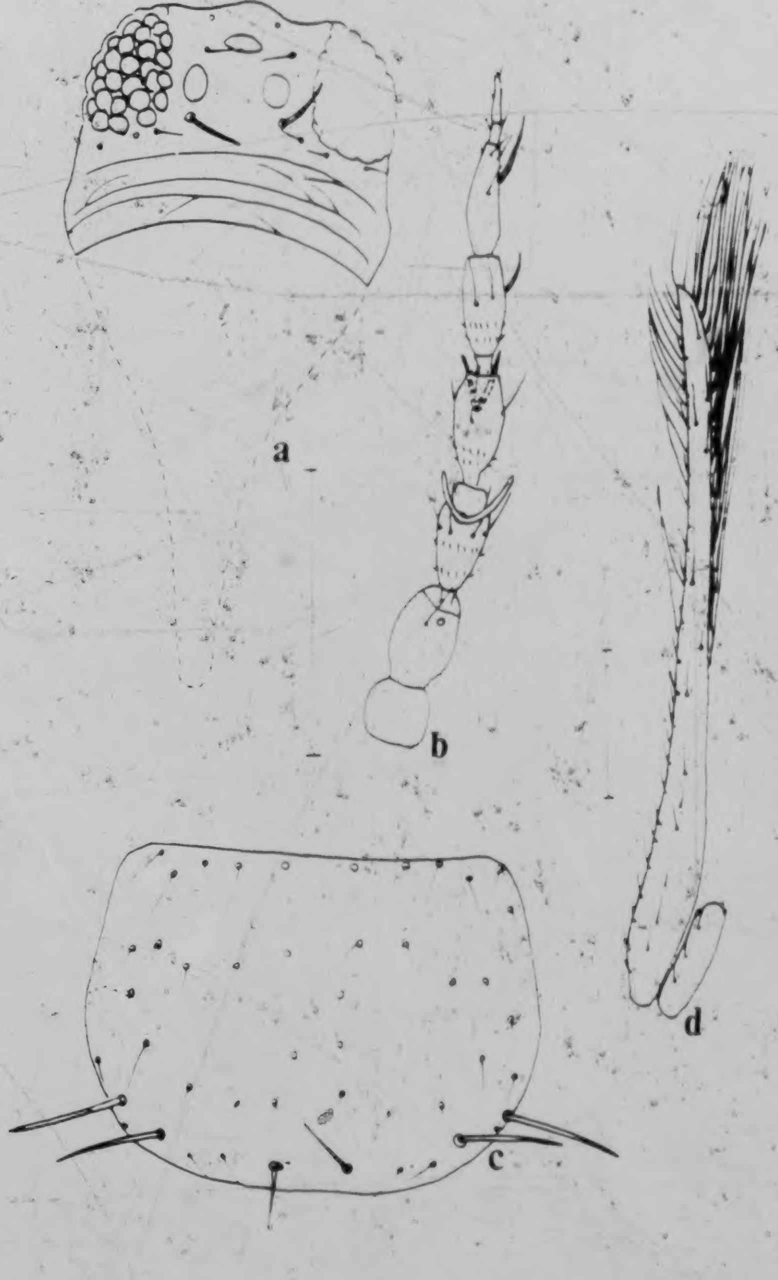
Diagnosis. Body yellow. Head wider than long. Interocellar setae outside ocellar triangle. Postocular pair I conspicuous. Antennal segments I to III and V yellow. Posteromarginal setae of pronotum 3 pairs; posteroangular setae subequal. Legs and forewings yellow. Mesosternal spinula absent. Posterior margin of abdominal tergite VIII without comb of microtrichia.

Members of this species resemble those of *T. sumatrensis* in not having a mesosternal spinula nor a comb of microtrichia on the posterior margin of tergite VIII. *T. atrichotus*, n. sp. females differ from those of the latter in having unbanded forewings and their interocellar setae placed outside the ocellar triangle. Adults of this species and other members of *Tusothrips* have very long mouthcones as in those of some leaf feeding tubuliferans.

Female macroptera. Head wider than long; transversely striate posteriorly (Fig. 59a). Interocellar setae outside ocellar triangle. Eyes more than one-third of head length. Postocular setae pair I conspicuous. Antennae more than 2 times as long as head; segments I to III and V yellowish; IV pale at base, shaded with brown in apical two-thirds; VI to VIII brown; segment VII longer than wide (Fig. 59b). Mouthcone very long, reaching posterior margin of prosternum (Fig. 59a).

Pronotum setose, with 3 pairs of posteromarginal setae mesad angulars; posteroangular setae subequal (Fig. 59c). Legs yellowish; midfemora very slender. Forewings yellow, without cross bands; anterior vein with 6 basal and 3 distal setae; posterior fringe cilia straight (Fig. 59d). Mesosternal spinula absent. Metascutum with median setae behind anterior margin; pair of campaniform sensilla present

Fig. 59. *Tusothrips atrichotus*, n. sp. female holotype. a. Head b. Right antenna c. Pronotum d. Forewing


a
b
c
d

Abdominal tergites transversely striate; tergal lateral setae developed. Tergite VIII without comb of microtrichia on posterior margin. Tergites IX and X with long, dark, B1 setae.

Dimensions (holotype female, um). Body length (extended) 1108.4. Head length 81.6, median width 98.6; interocellar setae 17; postocular setae I 18.7; dorsal eye length: 51; antennal segments I 22.1; II 34; III 42.5; IV 39.1; V 40.5; VI 37.4; VII 5.8; VII 15.3. Pronotum length 120.7, median width 147.9, major setae: pm I 22.1; pa I 31.4; pa II 40.8.

Male. Unknown.

Type data. **Holotype** female, PHILIPPINES: Visayas: Baybay, Leyte, on *Stachytarpheta* sp., 17-VI-1984, C. P. Reyes (**UPLB**). **Paratypes** (2 females) same data as holotype (**UPLB**).

Material examined. Type series only (**UPLB**).

Etymology. Atrichotus is a Greek word meaning "without hair" in reference to the absence of a comb of microtrichia on abdominal tergite VIII of these thrips.

Distribution (Fig. 61). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Baybay, Leyte.

Host. *Stachytarpheta* sp.

***Tusothrips immaculatus*, n.sp.**
Holotype female, Philippines: Mindanao: Agko, Mt. Apo (UPLB)
Figure 60a, b, c, d

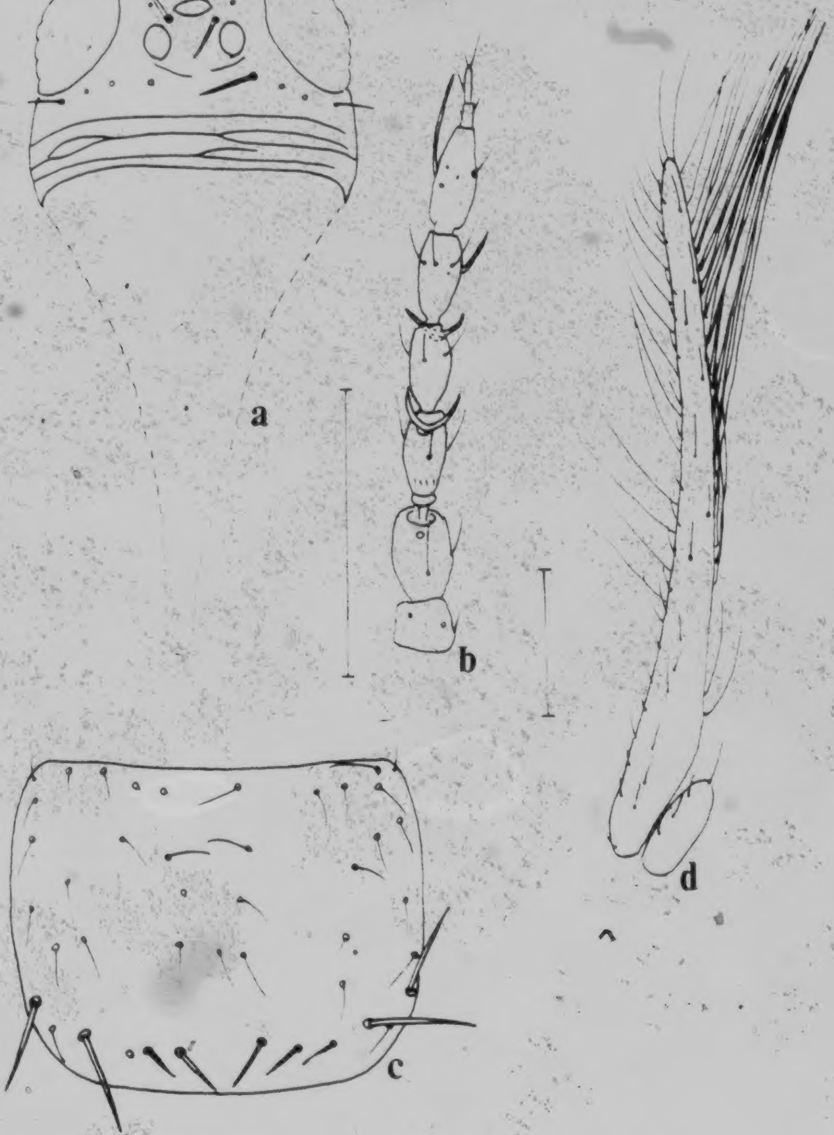
Diagnosis. Body yellow. Head wider than long. Interocellar setae placed inside ocellar triangle. Postocular setae pair I conspicuous. Antennal segment I yellow; II and III light brown; IV and V brown with yellow bases; VI brown with pale base; VII and VIII brown. Mouthcone reaching anterior third of mesosternum. Posteromarginal setae of pronotum mesad to angulars 3 pairs; posteroangular setae subequal. Legs yellow. Forewings yellow. Mesosternal spinula present. Posterior margin of abdominal tergite VIII with sparse, fine microtrichia laterally. Tergite X entire.

Members of *T. immaculatus*, n. sp. resemble those of *T. setiprivus* in having a mesosternal spinula. Adults of this species differ from those of the latter in having a sparse comb of microtrichia on the posterior margin of tergite VIII, abdominal tergite X entire and mouthcone longer.

Female macroptera. Head wider than long; transversely striate posteriorly (Fig. 60a). Interocellar setae inside ocellar triangle. Eyes more than one-third of head length. Postocular setae pair I conspicuous. Antennae more than 2.0 times as long as head; segment I yellowish; II and III light brown; IV and V brown with yellow bases; VI brown, with pale base; VII and VIII brown; segment VII longer than wide (Fig. 60b). Mouthcone very long, narrow, reaching anterior third of mesosternum (Fig. 60a).

Pronotum setose; posteromarginal setae mesad angulars 3 pairs; posteroangular setae of equal length (Fig. 60c). Legs yellowish; hindtibiae and tarsi with spine-like setae on inner margins at apex. Forewings yellow, without cross band; apical seta long; anterior vein with 6 basal, 3 distal setae; posterior fringe cilia straight (Fig. 60d). Mesonotum with widely spaced, transverse striae. Mesosternal spinula present. Metascutum faintly reticulate; median setae placed behind anterior margin; campaniform sensilla present.

Fig. 60. *Tusothrips immaculatus*, n. sp., female holotype. a. Head b. Right antenna c. Pronotum d. Forewing


a
b
c
d

Abdominal tergites transversely striate; tergal lateral setae well developed. Posterior margin of tergite VIII with sparse, fine microtrichia laterally. Tergites IX and X with developed, dark, B1 setae. Tergite X entire.

Dimensions (holotype female; um). Body length (extended) 1006.4. Head length 78.2; median width 110.5; interocellar setae 10.2; postocular setae I 15.3 ; dorsal eye length 44.2; antennal segments length: I 20.4; II 32.3; III 37.4; IV 32.3; V 34; VI 35.7; VII 6.8; VIII 11.9. Pronotum length 113.9, median width 141.1, major setae: pm 1 20.4; pa I 39.1; pa II 39.1.

Male. Unknown.

Type data. **Holotype** female, PHILIPPINES: Mindanao: Agko, Mt. Apo, on *Hibiscus rosa-sinensis*, 19-IV-1983, C. P. Reyes (**UPLB**). **Paratypes** (2 females) same data as holotype (**UPLB**).

Material examined. Type series only (**UPLB**).

Etymology. Immaculatus is a Latin word meaning "unspotted" in reference to the unbanded forewings of these thrips.

Distribution (Fig. 61). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo.

Host. Members of this species seems to feed on *Hibiscus rosa-sinensis* growing at higher altitudes since the same plants growing in the low lands, did not harbor these thrips.

Tusothrips setiprivus (Karny)
Mycterothrips setiprivus Karny, 1926: 200-201.
Holotype female, India: Coimbatore (**SMFG**)[examined]

Diagnosis. Body yellow. Head about as long as wide. Antennal segment 1 yellow; segments II, III and V yellowish brown; IV and VI to VIII greyish brown. Mouthcone reaching posterior margin of prosternum. Legs and forewings yellow. Metascutum with median setae near anterior margin. Abdominal tergite VIII without comb of microtrichia on posterior margin. Tergite X completely divided longitudinally. This is the first record of *T. setiprivus* in the Philippines.

Female macroptera. Head about as long as wide; transversely striate posteriorly. Interocellar setae well developed, outside ocellar triangle. Postocular setae pair I prominent. Antennal segment I yellow; II, III and V yellowish brown; IV and VI to VIII greyish brown; major sense cones on antennal segments V and VI from circular bases; segment VII about as long as wide. Mouthcone reaching posterior margin of prosternum.

Pronotum smooth; setose; posteromarginal setae mesad angulars 3 pairs, inner pair longest; posteroangular setae well developed. Legs yellow; tibiae with spine-like setae at apex. Forewings yellowish, without cross bands; wing apical seta long; posterior fringe cilia straight; scale yellow. Mesonotum with widely spaced, transverse striae. Mesosternal spinula present. Metascutum reticulate; median setae behind anterior margin; campaniform sensilla present.

Abdominal tergites transversely striate; lateral setae long. Tergite II with 3 dark lateral posteromarginal setae; laterotergite with 1 unshaded seta. Setae S3 on tergites VI to VIII reduced. Tergite VIII without comb of microtrichia on posterior margin. Tergite X completely divided longitudinally.

Male. Unknown.

Material examined. 2 females, Makiling Rainforest, Mt. Makiling, Laguna, in litter, 27-VI-1987, C. P. Reyes (**CPRC**); 2 females, taken in quarantine at Los Angeles, on flowers of *Amaranthus caudatus*, 29-IV-1986, D. Bickell (**USNM**).

Distribution (Fig. 61). The known range of this species extends from India to the Philippine Archipelago. In the Philippines, this species is known from the island of Luzon. PHILIPPINES: Luzon: Makiling Rainforest, Mt. Makiling, Laguna. INDIA.

Hosts: in litter, flowers of *Amaranthus caudatus*, in shoots of a wild legume

***Tusothrips sumatrensis* (Karny)**
Anaphothrips sumatrensis Karny, 1925a: 27,54.
Lectotype female, Indonesia: Sumatra (**SMFG**)[examined]
Anaphothrips (Chaetanaphothrips) aureus Moulton, 1936: 266.

Diagnosis. Body yellow. Head about as long as wide. Antennal segments I and II yellowish; III brownish yellow; IV and V brown with pale bases; VI to VIII brown. Legs yellow. Forewings yellowish with median brown cross band; basal fifth and scale brown. Mesosternal spinula absent. Posterior margin of tergite VIII without comb of microtrichia. Tergite X entire.

Female macroptera. Head about as long as wide, with faint transverse striae posteriorly. Interocellar setae well developed, outside ocellar triangle. Postocular setae pair I prominent. Antennal segments I and II yellowish; III brownish yellow; IV and V brown with pale bases; VI to VIII brown; segments III and IV each with forked sense cone; segment VII about 1.5 times as long as wide; major inner sense cones on segment V and VI arising from elongate bases. Mouthcone surpassing posterior margin of prosternum.

Pronotum smooth; setose; posteromarginal setae mesad angulars 3 pairs; inner pair longest; posteroangular setae developed, subequal. Legs yellow; tibiae with spine-like setae apically. Forewings yellowish, with broad brown cross band medially; basal fifth brown; apical seta very long; posterior fringe cilia straight; scale dark brown. Mesonotum with widely spaced transverse striae. Mesosternal spinula absent. Metascutum faintly sculptured; median setae behind anterior margin; campaniform sensilla present.

Abdominal tergites transversely striate; lateral setae well developed. Tergite II with 3 dark, lateral posteromarginal setae; laterotergite with 1 pale seta. Setae S3 on tergites VI to VIII reduced. Tergite VIII without comb of microtrichia on posterior margin. Tergite X entire.

Male macroptera. Similar to female in structure. Abdominal tergite IX with pair of dark, spine-like setae borne on a single, well produced tubercle. Abdominal sternites III-VII each with weak glandular area.

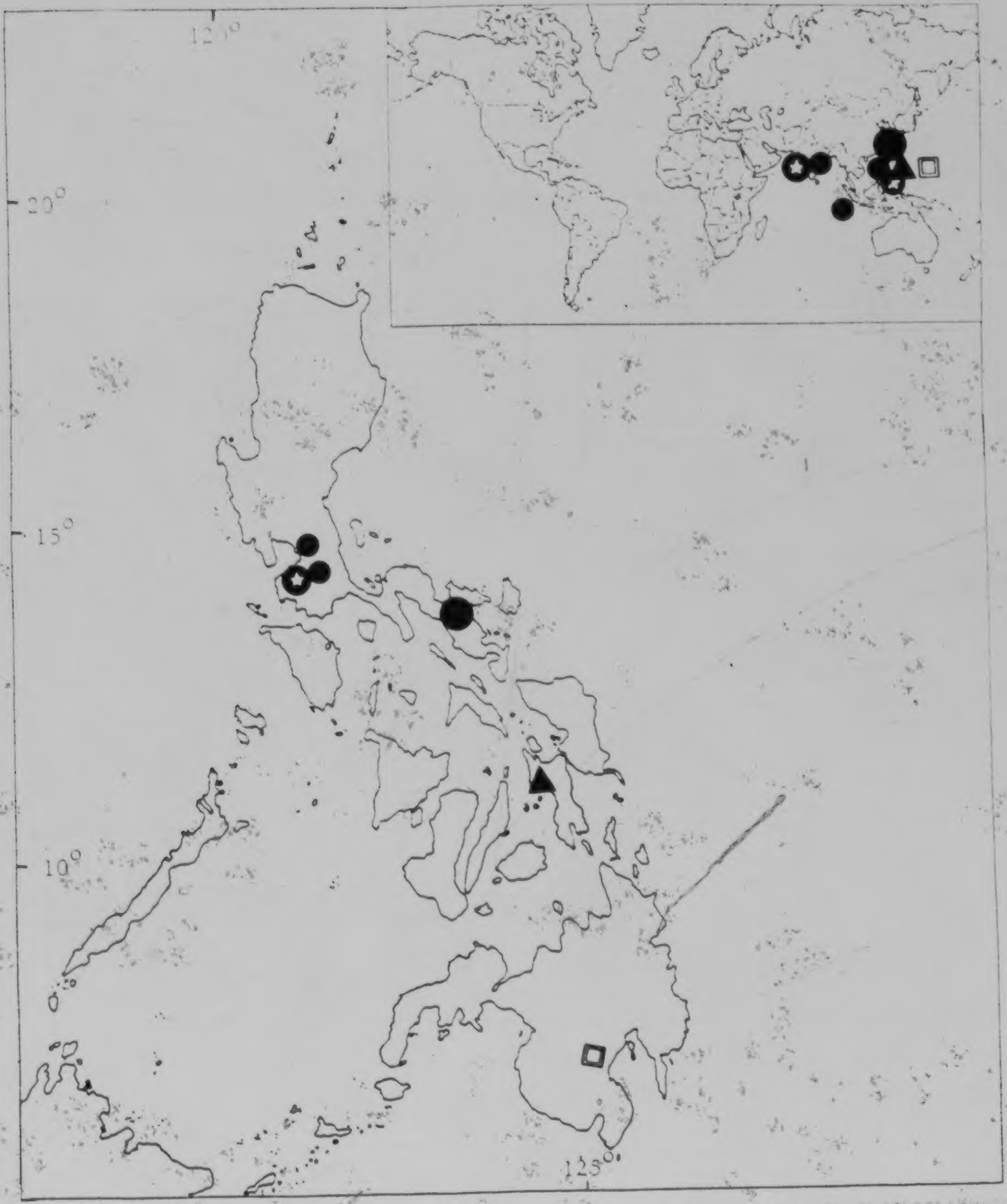
Material examined. **Holotype** female, *Anaphothrips (Chaetanaphothrips) aureus*, PHILIPPINES: Manila, on tomato plant, 10-VI-1931, I. D. Dobrosky (Moulton Coll.). **Paratypes** (2 males) same data as holotype (**CASC**); 1 female, UPLB, Los Banos, Laguna, on *Vigna sinensis*, 10-VII-1982, C. P. Reyes (**CPRC**).

Distribution (Fig. 61). The known range of this species extends from India to the Indonesia Archipelago. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: Manila; Los Banos, Laguna. INDONESIA: Sumatra. INDIA.

Hosts. tomato plant, *Vigna sinensis*, *Nicotiana tabacum*, on seed beds under *Solanum torvum*.

Fig. 61. Distribution of *Trichromothrips bruncurrum*, n. sp. and *Tusothrips* species in the Philippines, and world.

● *Trichromothrips bruncurrum*, n. sp.
▲ *Tusothrips atrichotus*, n. sp.
▣ *Tusothrips immaculatus*, n. sp.
● *Tusothrips setiprivus* (Karny)
✪ *Tusothrips sumatrensis* (Karny)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UNIVERSITY OF ALBERTA

SYSTEMATICS OF THE PHILIPPINE THYSANOPTERA

BY

CECILIA P. REYES

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND
RESEARCH IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY

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Suborder Tubulifera Haliday
Tubulifera Haliday 1836: 441.

Diagnosis. Head longer than wide (Fig. 7), rectangular and prolonged in front of eyes in few taxa. Three ocelli present in winged forms, absent in wingless forms. Ocellar setae 3 pairs. Eyes variously shaped, developed or reduced; prolonged ventrally in few taxa. Postocular setae 1 or 2 pairs. Antenna 8- or 7- segmented; segments III with 1 or more sense cones; IV with 2 or more sense cones. Maxillary stylets slightly to greatly retracted into head capsule when not in use, rarely confined to mouthcone; maxillary palpi 2-segmented. Mouthcone various in shape.

Pronotum with 5 pairs of major setae: anteromarginals, anteroangulars, midlaterals, epimerals and posteroangulars; epimeral sutures present or absent. Praepectus weakly sclerotized, divided into 2 plates, absent in few taxa. Fema separated. Foretarsi 1-segmented, those of mid and hindtarsi 1- or 2-segmented; all tarsi with hook-like tooth or hamus. Forewings, when present, without longitudinal veins; veinal setae absent; fringe cilia not from sockets, straight; wing surface without microtrichia. Mesopraesternum present (Fig. 9). Mesospinasternum not differentiated from metasternum.

Abdominal pleurites fused to tergites and not differentiated. Tergite I usually reduced to small median sclerite or pelta (Fig. 7), entire in few taxa. Median tergites each with 1 or more pairs of wing retaining setae. Tergite X tube-like; ventral surface entire; anal setae arising from platelets at end of tube; base of tube emarginate ventrally in males, completely cylindrical in females. Female ovipositor short, chute-like contained ventrally between tergites IX and X. Sternite VIII with or without glandular areas in males.

The suborder Tubulifera consist of about 2,700 species (Mound and Walker, 1986) placed in the single family Phleothripidae (Mound, Heming and Palmer, 1980). Members of this family are recognized by the characters described above. Phlaeothripids are fungal or plant feeders (leaves and flowers), with a few being predatory. Two subfamilies are currently recognized: Idolothripinae and Phlaeothripinae. Tribal and generic classifications, especially of Phlaeothripinae, are difficult to use since many genera are not well defined. In this paper, I list the genera alphabetically in each subfamily regardless of the tribal assignment recognized by other workers. Bhatti (1988) elevated Tubulifera to ordinal level in the superorder Thysanoptera. In the Philippines, 108 species in 2 subfamilies and 46 genera are here recorded.

Subfamily Idolothripinae Bagnall

Idolothripidae Bagnall, 1908a: 356.

Diagnosis. Head longer than wide, generally with short or very long prolongation in front of eyes. Three ocelli present in winged but absent in wingless forms. Ocellar setae 3 pairs, one pair developed. Eyes rounded and multifaceted, sometimes reduced to few facets; equally developed dorsally and ventrally or prolonged ventrally. Postocular setae 1 pair, 2 pairs in few taxa. Antennae 8- or 7- segmented; segment III with 2 sense cones; IV with 2 or more sense cones. Cheeks with series of setae; variously constricted behind eyes or towards base. Maxillary stylets broad, 5-10um in diameter; maxillary guides absent or developed in few taxa. Mouthcone rounded or pointed.

Pronotum with epimeral sutures present, incomplete or absent in few taxa; major setae 5 pairs; midlateral, epimeral and posteroangular setae developed. Praepectal plates present, reduced, or absent. Macropterous or apterous; forewings with few to numerous duplicated cilia. Forelegs each with small or large tooth in males or in both sexes; forefemora, tibiae sometimes coxae each with one or more tubercles. Meso and metanota reduced and fused in wingless forms. Mesopraesternum boat-shaped, reduced or absent in few taxa. Metathoracic sternopleural sutures present or absent.

Abdominal tergite I entire or in form of variously shaped pelta. Tergites II-VII each with 1 or more pairs of wing retaining setae, these sigmoidal but straight or flattened in few taxa. Tergite X or tube moderately swollen and with or without prominent, lateral setae; anal setae various in length. Females and males with B2 setae on tergite IX as long as B1 and B3. Sternal glandular areas in males usually absent, developed in those of a few species. Sternal accessory setae usually present.

About 600 species and 78 genera are presently included in this subfamily (Mound and Houston, 1987). Of these, 16 species in 12 genera are here recorded from the Philippines. Idolothripines all feed on fungal spores and live on dead twigs, in leaf litter or within the bases of grass and sedge tussocks (Mound and Houston, 1987). Mound and Palmer (1983) provided a tribal and subtribal classification for Idolothripinae and a key to all known genera.

Key to genera of the Philippine Idolothripinae

1 Abdominal tergites each with 1 pair of wing retaining setae; tube without conspicuous lateral setae 2

1' Abdominal tergites each with two or more pairs of wing retaining setae; tube with or without conspicuous lateral setae .... 7'

2(1) Wings absent; metasternopleural sutures exceptionally long, reaching hindcoxae .... *Compsothrips* Reuter

2' Wings present; metasternopleural sutures absent or when present not as above 3

3(2') Antennae 7-segmented; abdominal tergite II with anterior margin protruding onto pelta .... *Peltariothrips* Mound & Palmer

3' Antennae 8-segmented; abdominal tergite II not as above 4

4(3') Forefemora of female with row of short, dark tubercles; preocellar setae developed .... *Machatothrips* Bagnall

4' Forefemora of female without tubercles; preocellar setae variable 5

5 (4') Metanotum with a pair of campaniform sensilla; foretibiae of both sexes sometimes with tubercle 6

5' Metanotum without campaniform sensilla; foretibiae without tubercle.................................... 7

6(5) Antennal segment IV with 5 sense cones; eyes equally developed dorsally and ventrally .... *Diaphorothrips* Karny

6' Antennal segment IV with 4 sense cones; eyes prolonged ventrally .... *Ethirothrips* Karny

7(5') Head about as long as wide or slightly longer; maxillary stylets in form of V within head .... *Nesothrips* Kirkaldy

7' Head much longer than wide, nearly rectangular; maxillary stylets variable 8

8(7') Tube exceptionally long; abdominal tergites III to V with 5 pairs of wing retaining setae; metasternopleural sutures present .... *Neatractothrips* Mound & Palmer

8' Tube proportionately developed; abdominal tergites with 2 to 4 pairs of wing retaining setae; forewings broad or slender 9

9(8') Abdominal tergites III to V with 3 to 4 pairs of fan-shaped wing retaining setae; forewings slender .... *Paractinothrips* Mound & Palmer

9' Abdominal tergites III to V with 2 or 3 pairs of wing retaining setae; forewings moderately broad 10

10(9') Femora slender, irregularly swollen distally; antennae exceptionally long; tube with numerous developed setae .... *Meiothrips* Priesner

10' Femora slender or stout, not irregularly swollen distally; antennae moderately long; tube without conspicuous lateral setae 11

11(10') Maxillary stylets retracted into head; mesothoracic anterior angles of male with forked or unforked spiracular processes........................ *Dinothrips* Bagnall

11' Maxillary stylets short or barely retracted into head; mesothoracic anterior angles of male without spiracular process 12

12(11') Forefemora of male with sickle-shaped setae at apex; metasternopleural sutures present or absent ....*Elaphrothrips* Buffa

12' Forefemora of male without sickle-shaped seta at apex; metasternopleural sutures absent .... *Mecynothrips* Bagnall

Genus *Compsothrips* Reuter

Compsothrips Reuter, 1901: 214.
Type species: *Phloeothrips albosignata* Reuter, by monotypy.

Diagnosis. Head longer than wide, slightly constricted towards base; prolongation in front of eyes present. Eyes prolonged ventrally, with posterior ommatidia slightly enlarged. Postocular setae small. Antennal segments III and IV each with 2 sense cones respectively. Cheeks smooth. Maxillary stylets thick, retracted into head capsule about one third of head length, barely retracted in few taxa.

Pronotum small with major setae small. Praepectal plates ?present. Forefemora slender or slightly enlarged; foretarsi with tooth. Wings absent. Mesonotum short or long, almost rectangular. Metanotum constricted and raised medially, with pair of lateral, chalky white markings producing ant-like appearance or rectangular without median raised area. Metanotum without campaniform sensilla. Metasternopleural sutures present, exceptionally long, extended to hind coxae.

Abdominal segment I not reduced to pelta. Tergites II to VII with 1 pair of wing retaining setae. Tergite V usually with light brown spot on either side. Tube heavy and short, without prominent lateral setae.

This genus is circumtropical in distribution but with most species known from South America or Africa, with one species group represented in North America and a few species in the North African/Mediterranean region (Mound and Palmer, 1983). The well developed metathoracic sternopleural sutures of members of *Compsothrips* was suggested by Mound and Palmer (1983) to be correlated with the narrowed ant-like body form of these thrips. Twenty species are included in *Compsothrips* (Mound and Palmer (1983). One new species, *C. furvus*, is described from the Philippines.

***Compsothrips furvus*, n. sp.**
Holotype female, Philippines: Luzon: UP site, Pantabangan, Nueva Ecija (**UPLB**)
Figure 62a, b, c

Diagnosis. Body blackish brown. Head rectangular, with prolongation in front of eyes. Eyes prolonged ventrally; with posterior ommatidia enlarged. Antennal segment III more than twice as long as II; segment VIII with 6 sense cones arranged in longitudinal row. Thorax reduced; metanotum slightly longer than wide, ?without raised area. Legs brown. Abdominal tergite I yellow; tergites II to IX and tube dark brown. Sternites with pair of longitudinal striae medially.

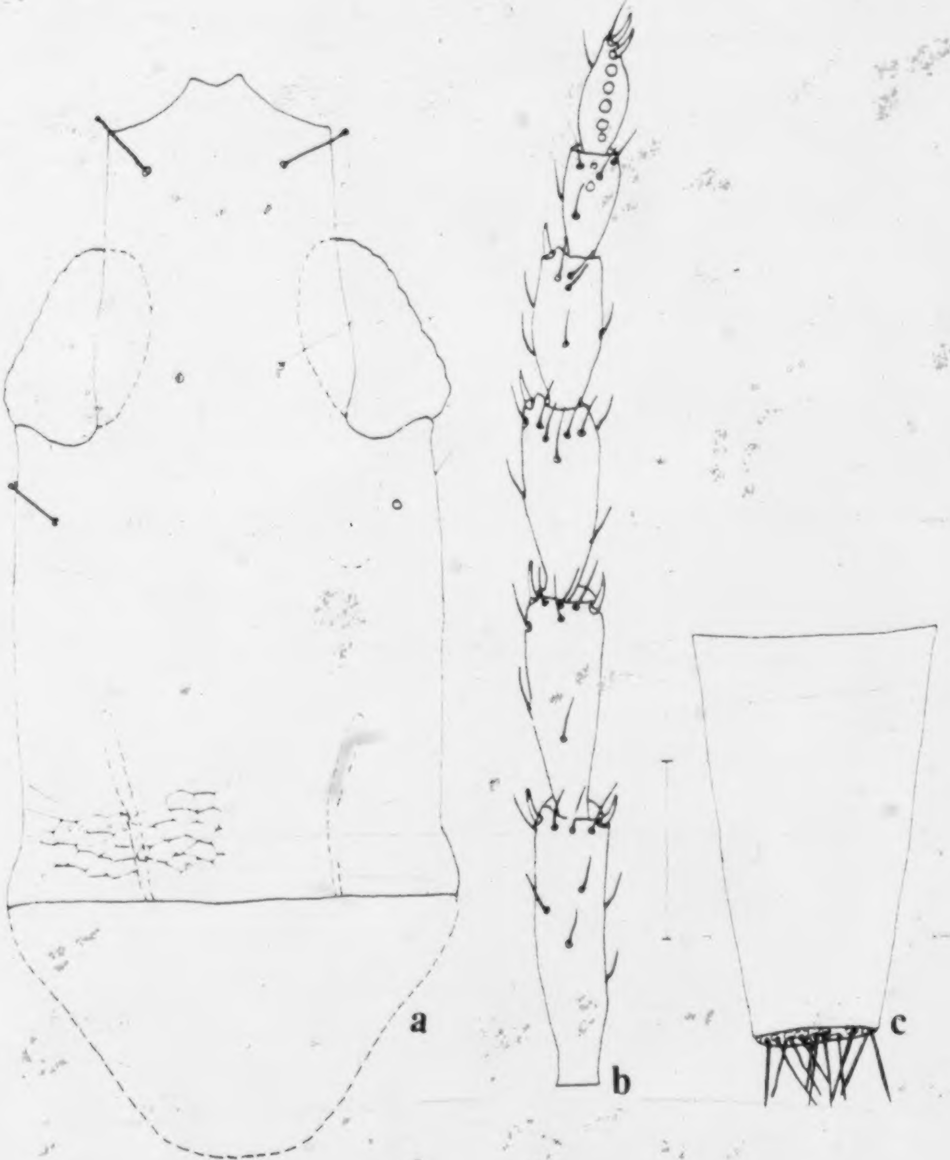
This species differ from *C. reuteri* Trybom from South Africa in having 6 sense cones on antennal segment VIII arranged in a longitudinal row, longer ocellar and postocular setae, and cheek setae fine.

Female aptera. Head rectangular more than 2.0 times as long as wide, including prolongation of vertex; reticulate; widest at base (Fig. 62a). Ocellar setae pale. Eyes prolonged ventrally, with posterior ommatidia enlarged. Postocular setae shorter than ocellars. Antennal segment III more than 2.0 times as long as II; segments III and IV each with 2 moderately stout sense cones; segment VIII elongate, constricted at base (Fig. 62b). Maxillary stylets about one third of head length. Mouthcone broadly rounded (Fig. 62a).

Pronotum small, with short setae. Legs brown; tarsi light brown; forefemora slender; foretarsi each with pointed tooth. Wings absent. Metanotum slightly longer than wide, ?without raised area medially.

Abdominal tergite I yellow; tergites II to X dark brown. Tube short, black, conical (Fig. 62c). Anal setae short, pale. Sternites with a pair of longitudinal striae submedially.

Fig. 62. *Compsothrips furvus*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII c. Tube


a
b
c

Dimensions (holotype female, um). Body length (extended) 2,910.4. Head length 482.8, median width 221; interocellar setae length 71.4; eye length 88.4; postocular setae length 57.8; antennal segments length: I 59.5; II 69.7; III 142.8; IV 103.7; V 98.6; VI 85; VII 51; VIII 59.5. Pronotum length 278.8, median width 299.2, major setae length: aa 34; pa 34; ep 61.2. Tergite IX setae length: B1 272; B2 217.6; B3 214.2. Tube length: 187.

Type data. **Holotype** female, PHILIPPINES: Luzon: UP site, Pantabangan, Nueva Ecija, on *Uraria lagopodoides*, 7-IX-1976, L. C. Raros (**UPLB**).

Male aptera. Similar to female in structure. Forefemora and foretarsal tooth larger. Pronotal major setae and B1 setae on tergite IX shorter.

Dimensions (allotype male; um). Body length (extended) 2,910.4. Head length 482.8, median width 217.6; interocellar setae length 64.6; eye length 88.4; postocular setae length 61.2; antennal segments length: I 68; II 78.2; III 142.8; IV 105.4; V 102; VI 85; VII 71.4; VIII 74.8. Pronotum length 278.8, median width 306, major setae length: aa 17; pa 20.4; ep 25.5. Tergite IX setae length: B1 238; B2 217.6; B3 224.4. Tube length: 183.6.

Material examined. **Holotype** female, U.P. site, Pantabangan, Nueva Ecija, on *Uraria lagopodoides*, 7-IX-1976, L. C. Raros. Others: 2 females, 1 male, Pantabangan, Nueva Ecija, on *Imperata cylindrica*, 7-IX-1976, L. C. Raros (**UPLB**).

Etymology. Furvus is a Latin word meaning "dark" in reference to the body color of these thrips.

Distribution (Fig. 63). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon.

PHILIPPINES: Luzon: Pantabangan, Nueva Ecija.

Hosts. *Uraria lagopodoides*, *Imperata cylindrica*.

Genus *Diaphorothrips* Karny

Diaphorothrips Karny, 1920b: 186.
Type species: *Diaphorothrips unguipes* Karny, by monotypy.

Diagnosis. Head rectangular, longer than wide; 1 pair of ocellar setae elongate. Eyes equally developed dorsally and ventrally. Cheeks with at least 8 pairs of setae. Antennae 8-segmented, segment VIII lanceolate, segment III with 2 sense cones, segment IV with 5. Maxillary stylets thick, retracted into head capsule almost to level of postocular setae, wide apart. Mouthcone almost pointed, reaching more than half the length of prosternum.

Pronotum with anterior margin thickened, at least in large specimens; epimeral sutures complete. Praepectal plates developed. Foretarsal tooth developed in both sexes; foretibiae with subapical tubercle in both sexes. Forewings broad with numerous duplicated cilia. metanotum with pair of campaniform sensilla. Metasternopleural sutures absent.

Pelta hat-shaped, with lateral margins curved forwards away from tergite II. Abdominal tergites II to VII with 1 pair of slightly curved wing retaining setae. Setae on IX shorter than tube. Tube heavy, about as long as head, margins slightly convex, without prominent lateral setae.

Adults of *Diaphorothrips* species resemble those of *Ethirothrips* in having a pair of campaniform sensilla on the metanotum, an unusual characteristic of the *Ethirothrips* genus-group (Mound and Palmer, 1983). Palmer and Mound (1978) provided a key to the 3 known Oriental species while Sakimura (1979) reported a species from Fiji. These medium-sized, dark brown thrips placed in 4 species are represented only by *D. hamipes* in the Philippines.

Diaphorothrips hamipes Karny
Diaphorothrips hamipes Karny, 1923: 296-299.
Syntype female, Indonesia: Java: (**SMFG**)[examined]

Diagnosis. Body dark brown. Body setae pale, with pointed apices. Cheek setae slender sometimes shaded. Antennal segment III yellowish brown in basal half, brown on apical half. Pronotal major setae well developed. Foretibiae and foretarsi each with large, pointed tooth. Forewings with dark, median, longitudinal stripe. Pelta triangular, with pair of campaniform sensilla. This species is known from a single female in the Philippines.

Female macroptera. Head rectangular, longer than wide, gradually narrowed towards base. Eyes small about 0.2 times as long as head. Postocular setae long, about 1.8 times as long as eyes. Cheeks setae slender and pale or shaded. Antennae generally dark brown; segment III yellowish brown in basal half, rather short and conical, less than 2.2 times as long as wide; VI with long outer sense cone; VIII constricted at base. Mouthcone rounded.

Pronotum with distinct median longitudinal line; anteroangular setae well developed; epimeral setae about 1.5 times as long as posteroangulars. Femora and mid and hindtibiae dark brown; foretibiae yellowish brown with dark margins; inner margin with large, pointed tooth near apex; foretarsi each with large, triangular tooth; tarsi yellowish brown; mid and hindtibiae with long setae on apical third. Forewings light brown in apical three-quarters, with dark, median, longitudinal stripe; duplicated cilia numerous. Metanotum reticulate.

Pelta reticulate, triangular; pair of campaniform sensilla present. Abdominal tergites II to VII with one pair of wing retaining setae. Tergite VIII gradually narrowed towards base; lateral setae 1 pair. B1 setae of tergite IX shorter than tube. Tube about 1.2 times as long as head; dark; constricted at base. Anal setae developed.

Male macroptera. Similar to female in structure but smaller. Abdominal tergite VIII sharply narrowed on posterior half; lateral setae 2 pairs. Tube with conspicuous lateral setae. Not known in the Philippines.

Material examined. 1 female, Philippines: Los Banos, Laguna, on woodpile, VIII-1931, D.T. Fullaway (Moulton Coll.) (**CASC**).

Distribution (Fig. 63). The known range of this species extends from Malaysia eastward in the Indonesian Archipelago and Fiji. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: Los Banos, Laguna. MALAYSIA: Kuala Lumpur. INDONESIA: Java; Sumatra. FIJI.

Hosts. on woodpile, under bark of *Citrus* sp., dry pods of *Caesalpinia* sp., dead twigs, dead branches

Genus *Dinothrips* Bagnall

Dinothrips Bagnall, 1908b: 190.
Type species: *Dinothrips sumatrensis* Bagnall, by monotypy.

Diagnosis. Head rectangular, about twice as long as wide; vertex projecting slightly in front of eyes. Preocellar setae 1 pair. Eyes large, equally developed dorsally and ventrally, with posterior ommatidium enlarged in each eye. Postocular setae 2 pairs. Antennae 8-segmented; segment III 5.0 to 5.5 times as long as broad, with 2 sense cones, segment IV with 4 sense cones. Cheeks with stout, spine-like setae clustered toward base. Maxillary stylets wide apart, retracted into head capsule, but not reaching level of postocular setae. Mouthcone short, rounded.

Pronotum shorter than head, almost twice as wide as long, usually with 5 pairs of developed major setae, with additional pair of posteroangular setae in few individuals. Praepectal plates reduced. Foretarsal tooth present in both sexes, much larger in males; forefemora of males enlarged with numerous, spine-like setae at base. Forewings parallel-sided with duplicated cilia. Mesothoracic spiracles of males produced into laterally projected, bifurcate processes, these not developed in females or in small males. Metanotum with out campaniform sensilla. Metasternopleural suture absent.

Pelta triangular, divided into 3 distinct sclerites. Abdominal tergites II-VII each with 2 pairs of sigmoid, wing-retaining setae, those on VII much reduced; tergal accessory setae straight; B1 setae on tergite IX longer than tube. Tube with straight sides, evenly narrowing to apex; lateral setae not conspicuous. Sternite IX of male with pair of large spines.

Adults of *Dinothrips* are large, dark, macropterous thrips which are principally oriental in distribution. Of 5 species currently included in this genus (Mound and Palmer, 1983), only *D. monodon* and *D. spinosus* are known in the Philippines. They are fungal feeders and are usually collected under bark of logs.

Key to Philippine species of *Dinothrips* Bagnall

1 Mesonotum of male with spiracular processes forked, sometimes reduced; cheeks setae about 70 to 140 um long .... *D. spinosus* (Schmutz)

1' Mesonotum of male with spiracular processes unforked and with dentate margins; cheeks setae less than 100 um long .... *D. monodon* Karny

Dinothrips monodon **Karny**
Dinothrips monodon Karny, 1920a: 204. Male.
Holotype male, Philippines: Butuan City (**SMFG**) [examined]

Diagnosis. Body brownish black. Body setae shaded. Head about 2 times as long as wide. Cheek setae spine-like, dark, about 100um long. Antennal segments III and IV with 2 and 4 sense cones respectively. Forefemora strongly incrassate. Foretarsi each with very large, inwardly directed tooth. Mesothoracic spiracular processes unforked but with dentate margins. Pelta broadly triangular, with 2 distinct lateral lobes. Tube about as long as head. This species is endemic to the Philippines.

Male macroptera. Head about 2 times as long as wide, widest in basal third, constricted towards base; transversely striate. Eyes about 0.25 times as long as head. Postocellar setae developed. Postocular setae longer than eyes, with blunt apices. Cheek setae spine-like, dark, about 100um long. Antennae coal black, each segment with strong setae submedially and subapically; segments III and IV with 2 and 4 sense cones respectively. Mouthcone rounded, reaching anterior half of prosternum.

Pronotum with distinct median longitudinal line; major setae developed. Forefemora strongly incrassate; surface with numerous setae, each borne on tubercle; foretarsi each with very large, inwardly directed tooth. Forewings dark basally, with median longitudinal dark stripe; duplicated cilia numerous. Mesothoracic spiracular process unforked, with dentate margin. Meso and metanota reticulate.

Pelta broadly triangular, with 2 distinct lateral lobes, reticulate. Abdominal tergites II to VI each with 2 pairs of wing retaining setae; posteroangles of tergites with well developed setae. Tube about as long as head.

Female macroptera. Similar to male in color. Surface of femora covered with pale setae, each borne on a tubercle. Mesonotum without spiracular process.

Material examined. 6 males, 1 female, on bark of fallen tree, San Jose, Mindoro, E. Ross (Moulton Coll.) (**CASC**); **Holotype** male, PHILIPPINES: Butuan, Mindanao, C. F. Baker (**SMFG**).

Distribution (Fig. 63). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Visayas and Mindanao.

PHILIPPINES: Visayas: San Jose, Mindoro; Mindanao: Butuan.

Host. bark of a fallen tree.

***Dinothrips spinosus* (Schmutz)**
Ischyrothrips spinosus Schmutz, 1913: 1078.
Holotype female, Sri Lanka (**Vienna**)[not examined]
Dinothrips sumatrensis Bagnall; Karny, 1920a: 203-204.
Dinothrips jacobsoni Karny; Moulton, 1947: 180.
Dinothrips spinosus (Schmutz); Palmer and Mound, 1978: 169-170.

Diagnosis. Brownish black species. Body setae shaded. Head about 2.0 times as long as wide. Antennal segments III and IV with 2 and 4 sense cones respectively. Cheek setae spine-like, dark, 50 to 90um long. Foretarsi each with triangular tooth. Forewings with dark, median, longitudinal stripe. Pelta broadly triangular, with distinct lateral lobes. Tube about as long as head or slightly longer.

Female macroptera. Head rectangular, widest on basal third, constricted towards base. Preocellar setae 90 to 150um. Eyes about 0.25 times as long as head. Postocular setae longer than eyes. Cheek setae spine-like, dark, 50 to 90um long. Antennae coal black; segment III yellowish basally, more than 3.5 times as long as apical dark band; segments III and IV with 2 and 4 sense cones respectively. Mouthcone rounded, reaching anterior half of prosternum.

Pronotum with distinct longitudinal median line; major setae well developed; epimeral tubercles weak. Surface of forefemora covered with numerous setae, each borne on tubercle; foretarsi each with strong, triangular tooth, about as long as half of tarsal width; midfemora with forwardly directed tubercle submedially. Forewings dark basally, with dark, median, longitudinal stripe; duplicated cilia numerous. Meso and metanota reticulate.

Pelta broadly triangular, with distinct lateral lobes, reticulate. Abdominal tergites II to VI each with 2 pairs of wing retaining setae; posteroangles of tergites with long, shaded setae. Sternite II with antecostal ridge not interrupted medially. Tube about as long as or slightly longer than head.

Male macroptera. Similar to female in color. Cheek setae 70 to 140um. long. Foretarsal tooth subcylindrical, slender about as long as width of tarsi. Mesonotum with a pair of forked, spiracular processes.

Material examined. 1 female, 1 male, Los Banos, Laguna, host unknown, 5-V-1932, F. C. Hadden; 1 male, Los Banos, Laguna, on woodpile, VIII-1931, D. T. Fullaway; 1 female, 4 males, San Jose, Occidental Mindoro, on bark [of unknown tree], VII-1945, E. S. Ross; 5 males, San Jose, Mindoro, on bark of fallen tree, E. Ross; Los Banos, on wood pile; Victorias, Negros Occidental, on [sugar] cane; 1 female, Visayas, Negros Occidental, on cane, 13-XI-1928, W. D. Pierce (Moulton Coll.) (**CASC**); 3 females, 11 males, trail to Mudspring, Mt. Makiling, on surface of bark of cutlogs, 27-VI-1987, C. P. Reyes; 1 female, PNAC, Aborlan, Palawan, in D-Vac sample, 26-I-1985, S. G. Reyes; 2 females, 6 males, Mt. Tabiey, Cabigaan, Palawan, on surface of bark, 23-V-1987, V. Fernando; 4 females, 8 males, Anuling, Pamocotan, Zamboanga, on bark of *Leucaena* , 11-VII-1987; C. P. Reyes (**CPRC**); 1 female, 2 males, Butuan, Mindanao, C. F. Baker (**SMFG**).

Distribution (FIG. 63). This species has an extensive distribution in tropical rainforests from India, Sri Lanka, and Sulawesi to New Guinea and is usually found in the company of *D. sumatrensis* Bagnall (Palmer and Mound, 1978). In the Philippines, this species is known from the four principal zoogeographic regions, on the islands of Luzon, Palawan, Visayas and Mindanao.

PHILIPPINES: Luzon: Los Banos; Mudspring, Mt. Makiling, Laguna; Quezon; Palawan: PNAC, Aborlan, Palawan; Mt. Tabiey, Cabigaan; Visayas: San Jose, Mindoro; Victorias Negros Occidental; Mindanao: Butuan City; Anuling, Pamocotan, Zamboanga. INDONESIA: Sumatra; Java; Sulawesi. MALAYSIA: Kuala Lumpur, Borneo, Sarawak. SINGAPORE. BURMA. INDIA. SRI

Hosts. bark of fallen tree, wood pile, [sugar]cane, surface of bark of cutlogs, in D-Vac sample, surface of bark, bark of *Leucaena* sp., stuck to sap of fallen tree, between wood and bark, on log of *Mallotus philippinensis*, under bark, under bark of *Albizzia* , on dead tree. About 500 of these thrips of various life stages are still in vials in my collection. They were collected in aggregations under the bark of piled logs of a dipterocarp tree in Mt. Makiling rainforest.

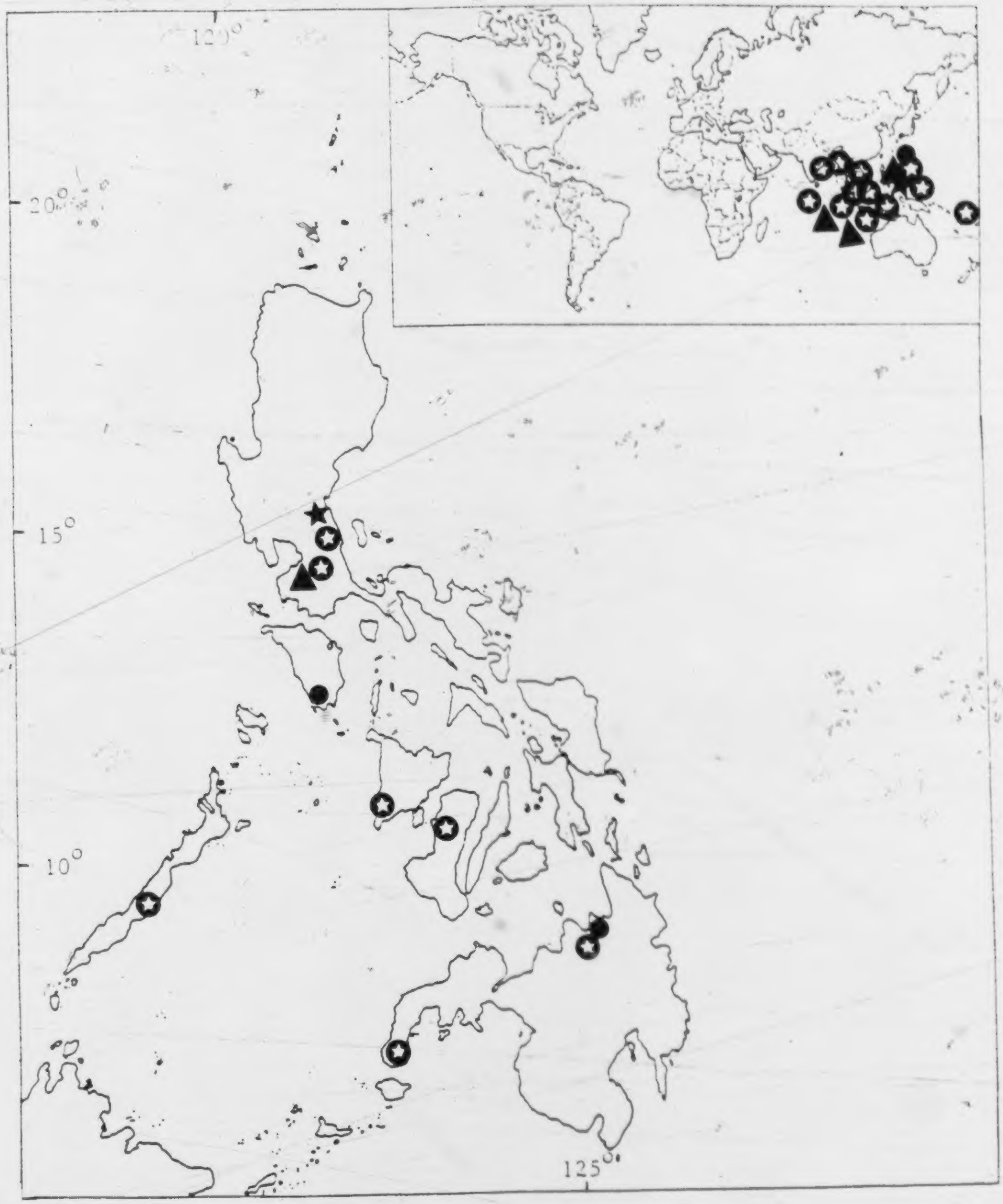
Fig. 63. Distribution of *Compsothrips furvus*, n. sp., *Diaphorothrips hamipes* Karny and *Dinothrips* species in the Philippines, and world.

★ *Compsothrips furvus*, n. sp.

▲ *Diaphorothrips hamipes* Karny

● *Dinothrips monodon* Karny

✪ *Dinothrips spinosus* (Schmutz)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Genus *Elaphrothips* Buffa
Elaphrothrips Buffa, 1909: 162-163.
Type species: *Idolothrips coniferarum* Pergande, by subsequent designation of Andre, 1940.

Diagnosis. Head usually elongate, 2.0 to 4.0 times as long as wide, with base slightly constricted; prolongation in front of eyes usually long. Foreocellus often placed far forward. Interocellar setae about as long as or longer than postocular setae, pointed at apex. Eyes large, equally developed dorsally and ventrally; posterior ommatidium enlarged. Antennae 8-segmented; segment III 4 to 7 times as long as wide, with 2 sense cones; segment IV with 4 sense cones. Cheeks with many stout spine-like setae, particularly in males. Maxillary stylets short, in form of V in head. Mouthcone short, broadly rounded.

Pronotum about half as long as head and about 1.5 times as wide as long, with 5 pairs of well developed, major setae. Praepectal plates well developed or reduced. Forefemora of males enlarged, usually each with a stout, sickle-shaped seta on outer side at apex; foretarsal tooth well developed in males, reduced or absent in females. Macropterous, micropterous, or brachypterous. Forewings in macroptera pale or shaded, slightly broadened in apical half, with 20 to 60 duplicated cilia. Metanotum without campaniform sensilla. Metasternopleural sutures absent, sometimes present.

Pelta broad, hexagonally reticulate, with lateral lobes well differentiated from median part. Abdominal tergites II-VII each with 2 pairs of sigmoid, wing retaining setae and with several additional pairs of usually sigmoid accessory setae. Posteromarginal setae of tergite VII straight. B1 setae of tergite IX longer than tube. Tube with straight sides, evenly narrowing to apex; lateral setae not conspicuous. Sternite IX of males with pair of large spines. Sternites II-VIII each with several small accessory setae, sometimes arranged in row.

Adults of *Elaphrothrips* species vary greatly in size and are the most widespread members of the Idolothripinae. Palmer and Mound (1978) considered Africa to be their area of greatest diversity. About 124 species are distributed throughout the tropics (Mound and Palmer, 1983) with *E. bakeri* and *E. denticollis* presently known from the Philippines.

Key to Philippine species of *Elaphrothrips* Buffa

1 Pelta with lateral lobes broadly joined to center; large males with slim forefemora and foretarsal tooth; cheek setae pale .... *E. denticollis* (Bagnall)

1' Pelta with lateral lobes narrowly joined to center; large males with short forefemora and foretarsal tooth; cheeks setae dark .... *E. bakeri* (Karny)

Elaphrothrips bakeri (Karny)
Dicaiothrips bakeri Karny, 1920a: 206
Holotype male, Philippines: Puerto Princesa, Palawan (**SMFG**)[examined]

Diagnosis. Body dark brown. Body setae pale. Head rectangular, with prolongation wider than long. Cheek setae spine-like, dark. Antennal segment III with dark brown patch at apex, not extending beyond apical bulge; segments III and IV with 2 and 4 sense cones respectively. Pronotal major setae well developed. Legs generally brown; forefemora stout, each with sickle-shaped seta towards apex. Pelta with lateral lobes, narrowly joined to center. Tube conical, pale at apex.

In my collection, a male collected from Surigao has an unusual right hindleg. It has 2 tibiae and tarsi! Palmer and Mound (1978) reviewed and provided keys to all known species of *Elaphrothrips*.

Male macroptera. Head rectangular, widest across eyes, constricted towards base; prolongation 2.4 to 3.4 times as wide as long. Ocellar and postocular setae well developed, with knobbed apices. Cheek setae numerous, strong, dark, with pointed apices. Antennae longer than head, coal black; segment III yellowish, with dark brown patch at apex, not extended beyond apical bulge, about quarter of the segment long; bases of segments IV and V evenly dark; segments III and IV with 2 and 4 sense cones respectively. Mouthcone rounded, reaching middle of prosternum.

Pronotum transverse, slightly dilated posteriorly, with distinct longitudinal median line; major setae well developed; midlateral setae close to and longer than anteroangulars; posteroangular setae longer than epimerals. Legs brownish; foretibiae and tarsi pale; forecoxae with short spine-like setae, with very long setae on angle; forefemora stout, each with a sickle-shaped seta towards its outer apex; surface covered with numerous spine-like setae, each borne on tubercle; inner margin with small, blunt tubercle near base. Foretibiae stout, with 2 or 3 strong, well developed setae on basal half of outer margin; foretarsal tooth stout, triangular. Forewings clear or pale yellowish, with dark, median, longitudinal stripe; duplicated cilia numerous; subbasal wing setae well developed and with pointed apices; setae S3 longest. Pterothorax with protruding foremargin; narrowed posteriorly.

Pelta with lateral lobes narrowly joined to center. Abdomen long and slender; anterior tergites subequal; posterior tergites longer than broad. Tergites II to VI each with 2 pairs of wing retaining setae. Tergites with long, pale setae laterally. Tergite IX strongly narrowed posteriorly; about one third as long as tube. B1 setae of tergite IX about as long as tube. Tube conical, dark brown, with pale apex. Anal setae shorter than tube.

Female macroptera. Similar to male in color. Forefemora without sickle-like setae; foretarsal tooth small.

Material examined. 1 female, PNAC, Aborlan, Palawan, host unknown, 27-I-1985, C. P. Reyes; 2 males, PICOP, Bislig, Surigao, on *Leucaena leucocephala*, 1975, R. S. Raros (**CPRC**); **Holotype** male, host unknown, Puerto Princesa, Palawan, C. F. Baker (**SMFG**).

Distribution (Fig. 64). The known range of this species extends from Malaysia eastward in the Philippines to the Indonesian Archipelago. In the Philippine Archipelago, this species is known from Palawan and Mindanao. PHILIPPINES: Palawan: Puerto Princesa; PNAC, Aborlan; Mindanao: PICOP, Bislig, Surigao. MENTAWI IS.: Sipora, Sioban; Siberoet. INDONESIA: Java; Sumatra. MALAYSIA: Borneo: Sarawak.

Hosts. *Leucaena leucocephala*, crumpled dry leaves, dry pods, dry pods of *Cassia alata*, dry leaves, *Caesalpinia pulcherrima*, dead branches and leaves, on bushes of fresh and dried leaves, *Hevea* sp.

***Elaphrothips denticollis* (Bagnall)**
Dicaiothrips denticollis Bagnall, 1909a: 527.
Holotype female, Indonesia: Nias (**TMNH**)[examined]

Diagnosis. Body dark brown. Body setae pale. Head rectangular, with prolongation longer than wide. Cheek setae spine-like, pale. Antennal segment III yellow; segments III and IV with 2 and 4 sense cones respectively. Pronotal major setae well developed. Legs bicolored; femora brown, tibiae brown with pale apices, and tarsi yellow; forefemora moderately enlarged, without sickle-like setae. Pelta with lateral lobes broadly joined to center. Tube conical, dark at apex. This is the first record of *E. denticollis* in the Philippines.

Female macroptera. Head rectangular, widest across eyes, constricted towards base; prolongation longer than wide; median setae usually long and stout, about four-fifths or more times as long as postocular setae. Ocellar and postocular setae well developed. Cheeks setae spine-like, pale. Antennae longer than head, brown; segment III yellow, 4.7 to 6.2 times as long as broad, longer than segment IV; segment IV and V with basal stem slightly paler than apex of segment; segments III and IV with 2 and 4 sense cones. Mouthcone rounded.

Pronotum transverse, with distinct, longitudinal median line; major setae developed; midlateral setae close to and longer than anteroangulars; posteroangular setae longer than epimerals. Femora brown; tibiae brown with pale apices; tarsi yellow; forefemora moderately stout, without sickle-shaped setae, surface covered with numerous spine-like setae, each borne on tubercle; foretibiae each with 2 setae on basal half of outer margin; foretarsal tooth slender; hindtibiae long, equal to or longer than median length of head including head prolongation. Forewings pale, with numerous duplicated cilia; subbasal wing setae S1 1 to 1.3 times as long as S2. Pterothorax with protruding foremargin.

Pelta with lateral lobes broadly joined to center. Abdominal tergites with numerous accessory setae; wing retaining setae 2 pairs; lateral setae well developed, pale. Tergite IX with B1 setae longer than tube. Tube conical; dark brown on extreme base and apex. Anal setae well developed.

Male macroptera. Similar to female in color. Forefemoral and foretarsal tooth vary in size. Foretarsi about 3 times as long as wide.

Material examined. 1 male, Sipit Saburan, Puerto Gallera, Oriental Mindoro, on leaves of cassava, 20-VI-1987, C. P. Reyes (**CPRC**); 1 female, 1 male, Ilomavis, [Kidapawan], North Cotabato, on dead leaves, 26-VII-1979, S. Okajima (**SMFG**).

Distribution (Fig. 64). The known range of this species extends from India eastward in the Philippines to the Indonesia Archipelago. In the Philippine Archipelago, this species is known from the islands of Visayas and Mindanao. PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro; Mindanao: Ilomavis [Kidapawan], North Cotabato. SRI LANKA. INDIA. BURMA. MALAYSIA: Selangor; Borneo. INDONESIA: Java, Nias, Sumba.

Hosts. leaves of cassava, dead leaves, sandal, leaves of *Flindersia brayliana*, *Citrus medica* v. *acida*, dead leaves and branches,on bushes of fresh and dried leaves

Genus *Ethirothrips* Karny

Ethirothrips Karny, 1925b: 133.
Type species: *Liothrips thomasseti* by subsequent designation, Priesner, 1949: 129.

Diagnosis. Head elongate; constricted or parallel sided at base, rarely sharply constricted. Postocellar setae usually short. Eyes ventrally prolonged. Postocular setae very long. Antennae 8 -segmented, segment III with 2 sense cones; segment IV with 4 sense cones. Cheeks with at least few setae. Maxillary stylets not wide apart, in form of U within head. Mouthcone elongate.

Pronotum reticulate, with major setae well developed; epimeral sutures complete. Praepectal plates present. Forefemora enlarged in both sexes; foretarsal tooth present in all males, absent in females of few species; foretibiae sometimes with small apical tubercle in one or both sexes. Forewings broad, parallel-sided. Metanotum with pair of campaniform sensilla. Metasternopleural sutures absent.

Pelta usually has weak lateral lobes, sometimes broad and entire. Tergites II-VII each with 1 pair of simple or slightly curved wing retaining setae. B1 setae of tergite IX longer than tube. Tube about as long as head, without prominent lateral setae.

About 32 species are included under *Ethirothrips* but only *E. stenomelas* is known from the Philippines. Mound (1974) and Mound and Palmer (1983) reviewed this genus. Most species known have been collected from dead twigs and branches.

***Ethirothrips stenomelas* (Walker)**
Phlaeothrips stenomelas Walker, 1859: 217.
Holotype female, Sri Lanka (**TMNH**) [examined]
Ethirothrips gigas (Karny); Priesner, 1928: 66.

Diagnosis. Body dark brown. Body setae long, dark, with pointed apices. Eyes slightly prolonged ventrally; posterior ommatidia enlarged. Antennal segment II pale at apex; segments III and IV with 2 and IV sense cones respectively. Pronotal major setae well developed. Legs generally brown with spine-like setae. Foretarsi each with triangular tooth. Forewings with dark, median, longitudinal stripe. Pelta broad medially, with lateral lobes. Tube about as long as head.

Female macroptera. Head rectangular, more than 2 times as long as wide, widest behind eyes; narrowest at base. Eyes about 0.25 times as long as head, slightly prolonged ventrally, posterior ommatidia enlarged. Ocellar setae developed. Postocular setae much longer than eyes, with pointed apices. Cheek setae slender, dark. Antennae brown; extreme base of segments I and III pale to yellowish; segment II pale at apex; VIII slightly constricted towards base; segments III and IV with 2 and 4 sense cones respectively. Mouthcone rounded.

Pronotum reticulate, with distinct median longitudinal line; major setae developed; anteromarginal setae about as long as anteroangulars; midlateral setae longer than anteroangulars; epimeral setae longer than posteroangulars. Legs generally brown, with spine-like setae; forefemora enlarged, brown; foretibiae brown with pale apices; foretarsi yellowish brown each with triangular tooth. Forewings brownish, each with dark, median, longitudinal stripe; duplicated cilia numerous; subbasal setae well developed, slender; setae S3 about 2 times as long as S1. Mesonotum transversely reticulate. Metascutum longitudinally reticulate; median setae short.

Pelta pointed anteriorly, broad medially, with lateral lobes; reticulate. Abdominal tergites II to VII each with 1 pair of accessory setae. B1 setae of tergite IX about as long as or shorter than tube. Tube about as long as head; dark; apex pale, constricted. Anal setae shorter than tube.

Male macroptera. Similar to female in structure but smaller and paler in color. Abdominal tergite IX with B1 setae much shorter than tube.

Material examined. 1 female, Los Banos, Laguna, on woodpile, VIII-1931, D. T. Fullaway; 3 females, Victorias, Negros Occidental, on *Bauhinia momordica*, 23-XII-1929 and 1 female, host unknown, 6-X-1927, W. D. Pierce (**CASC**); 1 female, NCPC, UPLB, Los Banos, Laguna, on *Cocos nucifera*, 29-IV-1987, C. P. Reyes; 1 female, Pagadian City, on *Zea mays* silk, VII-1985, E. Decena; 1 female, Anuling, Pamocotan, Zamboanga City, on *Cocos nucifera*, II-VII-1987, C. P. Reyes; 1 male, Ilomavis, Kidapawan, North Cotabato, on *Imperata cylindrica*, 5-V-1987, C. P. Reyes; 1 female, 1 male, Agko, Mt. Apo, on cutlogs, 3-V-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 64). The known range of this species extends from India and Madagascar eastward in the Indo-Australian Archipelago to the Pacific Islands. In the Philippine Archipelago, this species is known from the four principal zoogeographic regions, on the islands of Luzon, Palawan, Visayas and Mindanao. PHILIPPINES: Luzon: UPLB, Los Banos, Laguna; Palawan: N. Palawan; Visayas: Victorias, Negros Occidental; Mindanao: Pagadian City; Anuling, Pamocotan, Zamboanga City; Ilomavis, Kidapawan, North Cotabato; Agko, Mt. Apo. INDONESIA: Java. MALAYSIA. THAILAND. INDIA. SRI LANKA. AUSTRALIA. SAMOA. MELANESIA. NEW BRITAIN. U.S.A.: Hawaii. SEYCHELLES. RODRIGUEZ. MARQUESAS Is. MADAGASCAR. MAURITIUS.

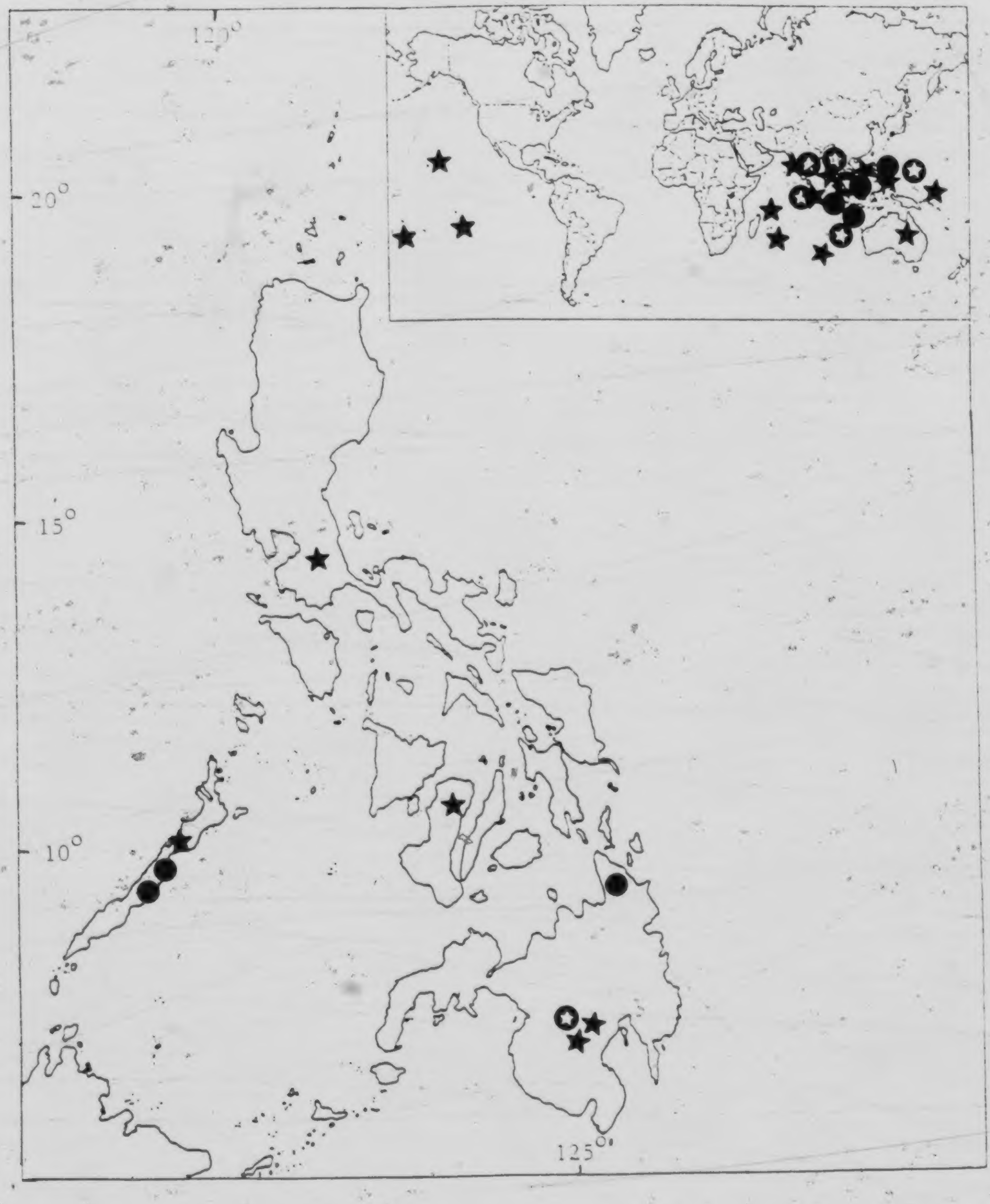
Hosts. *Cocos nucifera* , *Zea mays* silk, *Imperata cylindrica*, cutlogs, *Hevea* sp. The specimens from the Philippines have numerous medium-sized fungal spores in their guts.

Fig. 64. Distribution of *Elaphrothrips* species and *Ethirothrips stenomelas* (Walker) in the Philippines, and world.

● *Elaphrothrips bakeri* (Karny)

✪ *Elaphrothrips denticollis* (Bagnall)

★ *Ethirothrips stenomelas* (Walker)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Genus *Machatothrips* Bagnall

Machatothrips Bagnall, 1908b: 189.
Type species: *Machatothrips buincinatus* Bagnall, by monotypy.

Diagnosis. Head elongate, projecting slightly in front of eyes. One pair of preocellar setae developed. Eyes developed equally on dorsal and ventral surfaces. Postocular setae 2 pairs; pair 1 about twice as long as pair 2. Cheeks with stout, spine-like setae. Antennae 8-segmented; segment III 2.5 to 5.0 as long as wide, with 2 sense cones; IV with 4 sense cones. Maxillary stylets widely separated, in form of V in head. Mouthcone rounded.

Pronotum shorter than head, about twice as wide as long, with 5 pairs of developed, major setae; epimeral sutures complete. Praepectal plates reduced. Forefemora of both sexes enlarged; females and few males with row of teeth or spine-like setae on tubercles on inner margin; foretarsal tooth present in both sexes. Forewings broad, slightly broader in apical half, pale or slightly shaded, and with numerous duplicated cilia. Metanotum without pair of campaniform sensilla. Metasternopleural sutures absent.

Pelta broadly triangular; reticulate. Abdominal tergites II-VII each with 1 pair of slightly curved wing retaining setae. Tube with straight sides, evenly narrowing to apex, about as long as head, without prominent lateral setae. Sternites II-VIII each with row of small accessory setae; sternite IX in males with pair of long, stout setae.

Adults of *Machatothrips* are large, dark, macropterous thrips whose females, not the usual males, exhibit obvious sexually specific characteristics. Of 14 species known worldwide, 2 species, *M. artocarpi* and *M. antennatus*, occur in the Philippines.

Key to Philippine species of *Machatothrips* Bagnall

1 Postocular setae pair I about 10 times as long as pair II; forefemora of females with complete row of small tubercles .... *M. antennatus* (Bagnall)

1' Postocular setae pair I 2.5 to 3.5 times as long as pair II; forefemora of females with 3 to 5 teeth on inner margin at apical half .... *M. artocarpi* Moulton

Machatothrips antennatus **(Bagnall)**
Adiaphorothrips antennatus Bagnall, 1915: 588-597.
Holotype female, Malaysia: Borneo (**BMNH**) [examined]

Diagnosis. Body dark brown. Body setae pale. Eyes about 0.25 times as long as head; posterior ommatidia enlarged. Postocular setae pair I about 10 times as long as pair II. Antennal segments III and IV with 2 and 4 sense cones respectively. Cheek setae dark. Pronotal foreangles with group of spine-like setae. Legs predominantly brown. Forefemora with row of small tubercles; foretibiae each with tooth. Forewings with dark, median longitudinal stripe. Pelta broad, reticulate. Tube longer than head. This is the first record of *M. antennatus* in the Philippines.

Female macroptera. Head rectangular, transversely reticulate; slightly constricted towards base. Interocellar setae long, with rounded apices. Eyes about 0.25 times as long as head; posterior ommatidia enlarged. Postocular setae 2 pairs; pair 1 about 10 times as long as pair II. Cheek setae numerous, dark, spine-like. Antennae brown except extreme bases of segments I and III, and apex of II; III 2.8 to 3.8 times as long as wide; VIII elongate, longer than VII; segments III and IV with 2 and 4 sense cones respectively. Mouthcone rounded, reaching anterior half of prosternum.

Pronotum reticulate, with group of spine-like setae on foreangles; anteroangular setae spine-like; midlateral setae developed, about 0.4 to 0.7 times as long as anteroangulars; posteroangular setae shorter or about as long as epimerals. Legs predominantly brown; foretibiae and all tarsi pale; forefemora enlarged each with a row of small tubercles; spine-like setae numerous; foretarsi each with stout, triangular tooth; tibiae with long, thin setae. Forewings brown with dark, median, longitudinal stripe and with numerous duplicated cilia; subbasal wing setae S1 and S2 with expanded apices; S3 longest with rounded apices. Meso and metanota reticulate.

Pelta broad, reticulate; pair of campaniform sensilla present. Abdominal tergites reticulate; lateral setae long, pale, blunt to almost pointed at apex. Tergites II to VII each with 1 pair of slightly curved wing retaining setae; those on tergites III to VII longer and stouter. B1 seta of tergite IX longer than tube, about 5 times longer than B2; B3 longer than B1. Tube longer than head, with minute setae. Anal setae long, slightly shaded.

Male macroptera. Similar to female in structure and color but foretarsal tooth larger. A group of spine-like setae on the foreangles of the pronotum present. Pronotal epimeral setae about as long as posteroangulars.

Material examined. 1 male, Anuling, Pamocotan, Zamboanga, on bark of dead tree, II-VII-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 65). The known range of this species extends from Malaysia to the Philippines. In the Philippine Archipelago, this species is known from the island of Mindanao. PHILIPPINES: Mindanao: Anuling, Pamocotan, Zamboanga. MALAYSIA: Borneo; Kuala Lumpur; West Sarawak. SINGAPORE. RIAU Is.

Hosts. bark of dead tree, under bark of dead tree, dead branches, on fallen *Dialium wallichii* tree, in low herb

Machatothrips artocarpi Moulton
Machatothrips artocarpi Moulton, 1928: 322.
Holotype female, Taiwan (**CASC**) [examined]
Machatothrips artocarpi Moulton; Palmer and Mound, 1978: 189-190.

Diagnosis. Body dark brown. Body setae pale. Eyes more than 0.25 times as long as head; posterior ommatidia well developed. Postocular setae pair I 2.5 to 3.5 times as long as pair II. Antennal segments I and III yellowish basally; segment II pale apically; segments III and IV with 2 and 4 sense cones respectively. Pronotal major setae well developed. Forefemora each with 3 to 5 teeth on inner margin at apical half. Foretibiae each with tooth. Forewings with dark, median, longitudinal stripe. Pelta broad, reticulate. Tube longer than head. In terms of body armature, this species is rather simple compared to other species included in the genus (Palmer and Mound, 1978).

Female macroptera. Head rectangular, nearly parallel-sided; reticulate; broad at base. Interocellar setae well developed, with rounded apices. Eyes more than 0.25 times as long as head. Postocular setae 2 pairs, pair 1 2.5 to 3.5 times as long as pair 2. Cheek setae spine-like, pale. Antennae generally brown; segments I and III yellowish at extreme base; II with pale apex; III 3.5 to 4.4 times as long as wide; VIII shorter than VI; segments III and IV with 2 and 4 sense cones respectively. Mouthcone rounded, reaching posterior margin of prosternum.

Pronotum transverse; major setae well developed; anteromarginal setae about 0.6 to 0.9 times as long as anteroangulars. Forefemora brown with 3 to 5 separate teeth on inner margin in apical half; foretibiae brown and bowed; foretarsi pale, each with tooth. Forewings brown, with dark median, longitudinal stripe; duplicated cilia numerous. Meso and metanota reticulate.

Pelta broad, reticulate. Abdominal tergites II to VII each with 1 pair of wing retaining setae; lateral setae long, pale. B1 setae of tergite IX longer than tube; B2 very short; B3 slightly longer than B1. Tube longer than head, with minute setae. Anal setae long, dark.

Male macroptera. Similar to female in general structure and color but lacks forefemoral teeth. Foretarsal tooth larger. Not known in the Philippines.

Material examined. 1 female, Philippines: Laguna, on Lab. window, 15-VII-1931, I. D. Dobrosky; 1 female, Negros Occidental, on *Carica papaya*, 9-I-1929, W. D. Pierce (Moulton Coll) (**CASC**); 2 females, 2 immatures, Bo. Cale, Tanauan, Batangas, host unknown, 15-XII-1978, A. Barrion (**IRRI**).

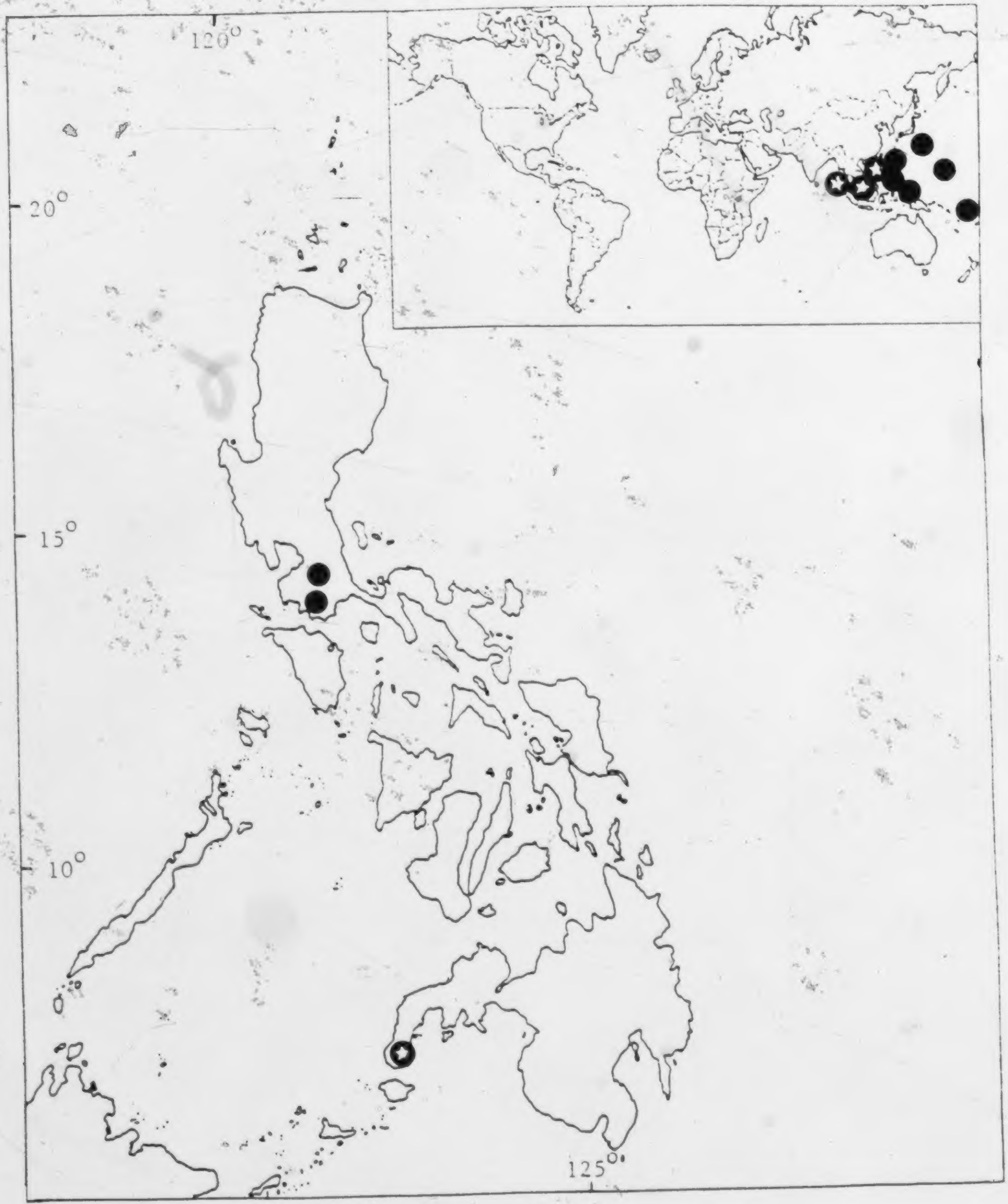
Distribution (Fig. 65). The known range of this species extends from Japan eastward in the other Pacific Islands to Solomon Island. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: Laguna; Bo. Cale Tanauan, Batangas. TAIWAN. JAPAN. GUAM. PAPUA NEW GUINEA. SOLOMON IS. PALAU IS. MICRONESIA. MELANESIA.

Hosts. *Carica papaya*, *Artocarpus* sp., under bark of decayed trees, seeds of *Corchorus* sp., under bark of decaying *Hiritiera tiliaceum*, bark of *Heritiera littoralis*, *Elaeaceus joga*, bark, dead fronds of *Areca macrocalyx*, dead twigs, under dead bark, in arable soil, on dried calyx of shrivelled *Cocos nucifera*, trunk of *Cocos* sp., fungi (Eumycetes), dead leaves and wood

Fig. 65. Distribution of *Machatothrips* species in the Philippines, and world.

✪ *M. antennatus* (Bagnall)

● *M. artocarpi* Moulton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Genus *Mecynothrips* Bagnall

Mecynothrips Bagnall, 1908c: 356.
Type species: *Mecynothrips wallacei* Bagnall, by monotypy

Diagnosis. Head elongate, 2 to 3 times as long as wide; prolongation in front of eyes longer than dorsal length of eyes and 2 to 3 times as long as wide. Ocellar setae 2 pairs, elongate; pair I near foreocellus, pair 2 posterior to ocellar triangle. Eyes sometimes prolonged dorsally. Postocular setae well developed. Antennae 8-segmented; segment III 6.0 to 11.5 times as long as wide, with 2 sense cones; segment IV with 4 sense cones. Cheeks with at least 3 pairs of pale, stout, spine-like setae borne on tubercles. Maxillary stylets retracted into head capsule. Mouthcone rounded.

Pronotum about one third as long as head, and 1.5 times as long as wide or slightly longer; usually with 5 pairs of major setae; anteromarginal, anteroangular and midlateral setae sometimes reduced; second pair of epimeral setae sometimes developed; pronotal anterior angles of some males with large, recurved horns. Forefemora of males and females enlarged, often rectangular or bulbous in males,\ with apical tooth, and with or without median or basal tubercle. Foretibiae of males with or without seta-bearing tubercle at apex; foretarsal claw usually well developed in females and most males. Forewings broad, slightly broader in apical half, pale or shaded, with numerous duplicated cilia. Metanotum without campaniform sensilla. Metasternopleural suture absent.

Pelta broad with lateral lobes. Abdominal tergite II with at least 2 pairs of wing retaining setae. Tergites III-V each with 3 pairs of sigmoid wing-retaining setae and numerous sigmoid accessory setae. Median pair of setae on tergite IX 0.4 to 1.25 times as long as tube. Tube with straight sides, evenly narrowing to apex; lateral setae not developed. Sternite IX of male with pair of stout setae.

Mecynothrips include about 14 species that are mostly Oriental and Australian in distribution. Palmer and Mound (1978) recognized 3 species groups under this genus. The *simplex* group is the most northern in distribution and includes species from East Africa, Sri Lanka, Indonesia, Malaysia, and the Philippines. *M. simplex* is the sole species recorded from the Philippines.

Mecynothrips simplex **Bagnall**
Mecynothrips simplex Bagnall, 1912a: 216.
Holotype male, Philippines (TMNH)[examined]

Diagnosis. Head dark brown. Head rectangular, with prolongation much longer than wide. Cheek setae spine-like, pale. Antennal segments III and IV brown on apical bulge; segments III and IV with 2 and 4 sense cones. Pronotum with square foreangles; anteromarginal setae vestigial. Forewings pale on basal half, margins shaded with brown on apical half. Pelta broad medially, with lateral lobes. Tube dark, slightly constricted at base. This species is known in the Philippines only from the type material.

Male macroptera. Head narrowest behind eyes, widest on basal third; slightly constricted at base; with closely spaced transverse striae; prolongation more than 2 times as long as wide. Postocular setae shorter than median setae, with rounded apices. Cheek setae strong, pale. Antennal segments I and II brown; segments III and IV slender, brown on apical bulge, pale or dusky at base, each with 2 and 4 slender sense cones respectively; segment VI asymmetric with yellow basal quarter; VII and VIII brown. Mouthcone broadly rounded.

Pronotum with square foreangles; major setae with rounded apices; anteromarginal setae vestigial; midlateral setae close to anteroangulars; epimeral setae longer than posteroangulars. Forefemora enlarged, each with 1 apical seta; foretibiae each with 2 small teeth at base on larger males, absent on small males; foretarsi with long, slim tooth; mid and hindtibiae bicolored brown and yellow. Forewings pale on basal half, margins shaded with brown on apical half; subbasal wing setae well developed, with rounded apices; seta S3 longest. Mesonotum transversely reticulate. Metanotum longitudinally reticulate; median setae short.

Pelta broad medially, with lateral lobes; reticulate. Abdominal tergites reticulate; lateral accessory setae sigmoidal. Tergites II to VII each with 2 pairs of wing retaining setae; lateral setae of tergites pale, with rounded apices. B1 setae of tergite IX shorter than tube, dark, with pointed apex. Tube dark, slightly constricted at base. Anal setae developed.

Female macroptera. Similar to male in color. Foretibiae and foretarsi both without teeth.

Material examined. Holotype male, PHILIPPINES, host unknown, E. Simon. (**TMNH**).

Distribution (Fig. 66). The known range of this species extends from India eastward to Indonesia Archipelago. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: ?Manila. INDONESIA: Java. MALAYSIA: Penang, Borneo. INDIA. SRI LANKA.

Hosts. banana fruits, bushes, sandal, dry leaves loose bark of decaying fungus infested tree, fungus-infected sheaths of *Areca catechu*, dried smut-infested leaves of a huge fallen *Mangifera* sp. tree, dry leaves and twigs, dead leaves of *Hevea* sp., sheath of *Areca* sp., dry twig, dead leaves, dead leafy branch

Genus *Meiothrips* Priesner

Meiothrips Priesner,1929b: 197
Type species: *Idolothrips* (*Meiothrips*) *annulatus* Priesner by original designation.

Diagnosis. Head long, vertex projecting in front of eyes; foreocellus between bases of antennae; inter and postocellar setae well developed. Eyes prolonged dorsally. Postocular setae 1 pair, placed close together. Cheeks with at least 2 pairs of short, stout setae. Antennae 8-segmented, exceptionally elongate, segment III as long as foretibiae, or slightly longer, with 2 sense cones, segment IV with 4 sense cones.

Pronotum with major setae well developed; epimeral sutures incomplete. Praepectal plates weakly developed, lateral to mouthcone. Femora slender but irregularly swollen distally, each bearing 4 pairs of stout, capitate setae; foretarsi without tooth. Forewings with or without duplicated cilia. Mesonotal lateral, median and metepimeral setae stout and elongate. Metanotum without campaniform sensilla. Metasternopleural sutures absent.

Pelta pointed medially, with broad lateral wings. Abdominal tergites II-VII each with 2 pairs of sigmoid, wing retaining setae and several accessory setae laterally. Tergites III-VI each with antecostal ridge recurved medially. B setae on tergite IX short. Tube with numerous, developed setae, with or without tubercles or denticles in males.

Only 3 species are presently included in this genus (Mound and Palmer, 1978). Palmer and Mound (1978) considered *Meiothrips* closely related to *Bactridothrips* and *Idolothrips*. Females of *Meiothrips* species can be distinguish by their exceptionally long antennae, slender head, and slender femora, having irregular distal swellings. Only *M. menoni* is known from the Philippines.

Meiothrips menoni Ananthakrishnan

Meiothrips menoni Ananthakrishnan, 1964: 99-101.
Holotype female, India: Trichur (**Ananthakrishnan**)[not examined].

Diagnosis. Body brown. Body setae pale. Head rectangular, with short prolongation. Cheek setae few, pale, strong behind eyes and on subbasal margin. Antennae very long, with slender segments; segment III longer than foretibia; segments III and IV with 2 and 4 sense cones respectively. Forefemora brown, with wedge-like pale area apically. Pelta triangular, pointed medially with lateral lobes. Anterior margin of abdominal tergites III to VI indented medially. Tube longer than head.

This is the first record of *M. menoni* in the Philippines. Specimens from the Philippines have yellowish foretibiae each with a small, subapical brown mark and their head setae are brownish and short while those on the pronotum are pale and long. These specimens differ slightly from those from Malaysia and Indonesia in their antennal and foreleg coloration. Palmer and Mound (1978) suggested that *M. menoni* exists as a cline between Southern India and Malaysia.

Female macroptera. Head rectangular, prolongation short, wider than long. Interocellar setae well developed, with rounded apices, longer than postoculars. Cheek setae few, pale, strong behind eyes and on subbasal margin. Antennae very long, slender; segments I and II brown; III, IV and V yellowish, brownish medially and apically; VI to VIII light brown; segment III longer than foretibia; segments III and IV with 2 and 4 sense cones respectively. Mouthcone elongate, rounded.

Pronotal major setae well developed, with rounded apices; anteromarginal setae longer than anteroangulars; posteroangular setae slightly longer than epimerals. Forefemora brown, each with wedge-like pale area apically; mid and hindfemora bicolored brown and yellow; foretibiae yellow, with small brown subbasal and subapical marks (Malaysian and Indonesian specimens have an extensive, dark brown, subbasal and narrow, dark brown, subapical areas on their tibiae); mid and hindtibiae with subbasal yellow area; lateral margins brownish with wart-like processes. Forewings yellowish, with dark, median, longitudinal stripe; 18 duplicated cilia; subbasal wing setae slender; setae S3 more than 2 times as long as S2. Mesonotum smooth anteriorly; transverse striae anastomosed medially on posterior half. Metanotum faintly reticulate; median setae long, behind anterior margin.

Pelta reticulate, broadly triangular, pointed medially, with lateral lobes. Abdomen slender, with several accessory setae; lateral setae long, pale, with rounded apices. Tergites II to VII each with 2 pairs of wing retaining setae. Anteromargin of tergites III to VI indented medially. Tergite IX small; B1 setae longer than width of segment, blunt at apex. Tube with well developed setae; longer than head. Anal setae well developed.

Male macroptera. Similar to female in structure. Tube without dorsal tubercles or denticles. Posteroangles of abdominal tergites without thorn-like setae.

Material examined. 1 female, Agko, Mt. Apo, host unknown, 5-V-1987, C.P.Reyes; 1 male, Agroforestry area, VISCA, Baybay, Leyte, in Malaise trap, 26-III to 16-V-1985, L. C. Raros (CPRC).

Distribution (Fig. 66). The known range of this species extends from India eastward in Malaysia to the Indonesia Archipelago. In the Philippine Archipelago, this species is known from the island of Visayas and Mindanao. PHILIPPINES: Visayas: VISCA, Baybay, Leyte; Mindanao: Agko, Mt. Apo. INDIA. THAILAND. MALAYSIA. INDONESIA.

Hosts. in malaise trap, leaf of *Musa* sp., logs of wood, dry twigs, and leaves of a fallen tree, dry twigs of *Coffea* sp., decaying leaves of *Mangifera* sp., decaying sheath of *Areca* sp., dry leaves, beating logs, leaf of *Areca* sp., dead leaves, dead branches

Genus *Neatractothrips* Mound and Palmer

Neatractothrips Mound and Palmer 1983: 85.
Type species: *Neatractothrips macrurus* (Okajima), by monotypy.

Diagnosis. Head elongate; vertex prolonged in front of eyes. Preocellar and cheek setae stout. Eyes moderately large. Postocular setae short. Antennae 8-segmented; segments I and II with dorsal setae enlarged; segment III longer than IV; III with 2 sense cones; IV with 4 sense cones. Maxillary stylets forming V in the head capsule. Mouthcone broadly rounded.

Pronotum about half as long as head; epimeral sutures almost complete; anteroangular and midlateral setae close together; praepectal plates small. Femora with several large setae; foretarsi in both sexes without tooth and with inner margin slightly raised. Mesothoracic epimeral setae well developed. Forewings broad, without duplicated cilia. Metanotal setae short; campaniform sensilla absent. Metasternopleural sutures absent.

Pelta broadly triangular. Abdominal tergites produced into 2 pairs of tubercles posterolaterally. Tergites III-V each with 5 pairs of wing retaining setae. Setae on tergite IX very short. Tube exceptionally long, with conspicuous lateral setae. Sternites each with more than one row of discal setae.

This is a monobasic genus from the Orient. Mound and Palmer (1983) considered *Neatractothrips* species to be closely related to those of *Paractinothrips*. Unlike the holotype from Ryukyu Island (Japan), specimens from the Philippines do not have a foretarsal tooth.

Neatractothrips macrurus **(Okajima)**
Atractothrips macrurus Okajima, 1975: 13-19.
Holotype female, Ryukyu Is. : Mt. Maeshi-dake, Ishigaki (**Okajima**)[not examined]
Neatractothrips macrurus (Okajima); Mound and Palmer, 1983: 85.

Diagnosis. Body yellowish brown. Body setae expanded. Head rectangular, with warty surface, prolongation slightly wider than long. Cheek setae 3 pairs, stout. Antennae long, slender; segments III to VIII yellow; segments III and IV with 2 and 4 sense cones respectively. Pronotum much longer than head; anteroangular and epimeral setae each borne on tubercle. Forewings without duplicated cilia. Pterothorax wider than prothorax. Pelta broad, with lateral lobes. Tube slender, much longer than head. This species is known in the Philippines only from the collection of Okajima.

Female macroptera. Head about 2 times as long as wide; covered with warts laterally and posteriorly; medially with 3 pairs of minute setae arranged in longitudinal rows; prolongation about 0.9 times as long as wide. Major interocellar setae and a pair of minute setae present. Cheeks subparallel with 3 pairs of stout setae submedially and medially. Antennae long, slender; segments I and II partly brown; III to VIII entirely yellow; segment III longest, about 1.5 times as long as IV, with 2 and 4 setiform sense cones respectively. Mouthcone elongate, broadly rounded.

Pronotum about 5 times as long as head; major setae well developed; anteroangular and epimeral setae each borne on tubercle; anteromarginal setae shorter than anteroangulars; midlateral setae close to anteroangulars; epimeral setae longer than posteroangulars. Femora with stout setae; yellow to yellowish brown; foretarsi with or without ill-defined tooth; apices of tibiae and tarsi pale yellow. Forewings brownish, with dark median longitudinal stripe; duplicated cilia absent; subbasal setae minute; scale weakly developed. Meso and metanota shaded with brown laterally, wider than pronotum. Metanotum thickened and arched laterally.

Pelta broad, with lateral lobes; reticulate. Abdomen slender. Tergites II to VIII wider than long. Tergite IX about 1.7 times as long as wide. Tergites II to VIII tinged with brown. Tergite IX paler than head without prominent setae. Tergites II, III, IV, V and VI with 3, 5, 5, 5, and 2 pairs of wing retaining setae respectively; those on tergite VI short. B2 setae on tergites II to VIII long, stout each borne on tubercle. Tube slender, about 4.4 times as long as head, with sparse, minute setae; base of tube pale yellowish brown, darkened towards apex. Anal setae minute.

Male macroptera. Similar to female in structure and color.

Material examined. 14 females, 4 males, Quezon National Park, on dead leaves of wild Palmaceae, 16-VIII-1979, S. Okajima (**TMNH**).

Distribution (Fig. 66). The known range of this species extends from Japan to the Philippines. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: Quezon National Park. JAPAN: Ryukyu Is.

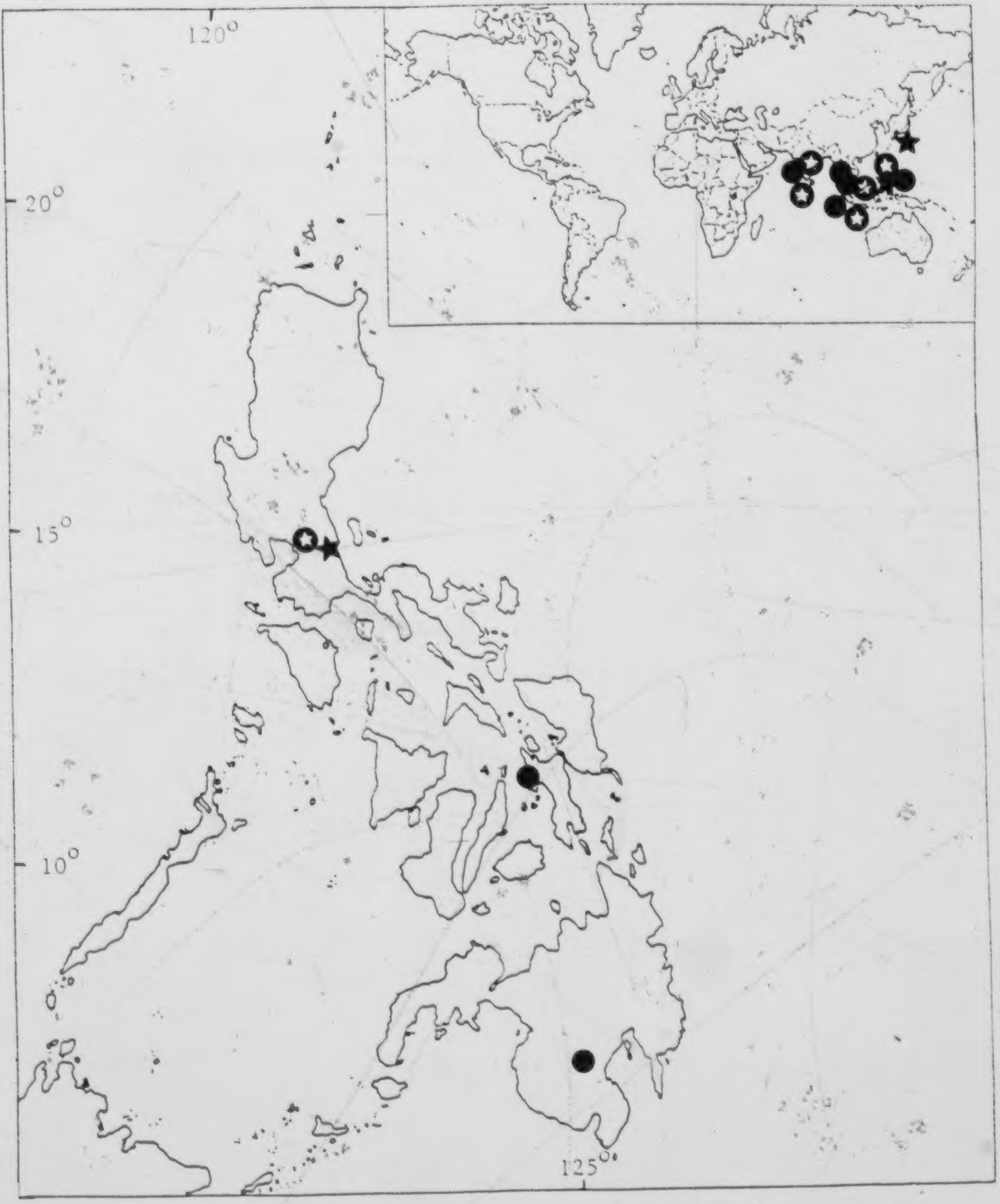
Hosts. dead leaves of wild Palmaceae, dead ferns

Fig. 66. Distribution of *Mecynothrips simplex* Bagnall, *Meiothrips menoni* Ananthakrishnan and *Neatractothrips macrurus* (Okajima) in the Philippines, and world.

✪ *Mecynothrips simplex* Bagnall

● *Meiothrips menoni* Ananthakrishnan

★ *Neatractothrips macrurus* (Okaima)


120°
20°
15°
10°
125°

Genus *Nesothrips* Kirkaldy

Nesothrips Kirkaldy, 1907: 103.
Type species: *Nesothrips oahuensis* Kirkaldy, by monotypy.

Diagnosis. Head variable, wider than long to longer than wide, transversely reticulate. Eyes sometimes prolonged ventrally. 1 pair of ocellar setae inserted between or behind posterior ocelli. Postocular setae 1 pair. Cheek setae fine. Antennae 8-segmented, base of segment VIII narrower than apex of segment VII; III with 2 sense cones; IV with 4. Maxillary stylets in form of V within head, usually retracted about halfway into head capsule. Mouthcone broadly rounded.

Pronotum transverse, enlarged in large males; all major setae well developed. Praepectal plates present. Foretarsal tooth small, present in males, absent in females. Macropterous or brachypterous. Forewings broad, and with or without duplicated cilia. Metanotum without campaniform sensilla. Metathoracic sternopleural absent.

Pelta broad, with lateral lobes. Tergites II to VII each with 1 pair of slightly curved wing retaining setae. B1 setae of tergite IX short. Tube straight sided, without strong reticulations; shorter than head and without prominent lateral setae.

Nesothrips species are closely related to those of *Carientothrips* Moulton which has not been recorded from the Philippines. Members of the latter genus can not be distinguished from *Nesothrips* on any single character (Mound and Walker, 1986). Twenty four species of *Nesothrips* are known worldwide. Of these, only 2 species, *N. brevicollis* and *N. lativentris*, are represented in the Philippines. Members of *Nesothrips* are usually collected on dead leaves and twigs.

Key to Philippine species of *Nesothrips* Kirkaldy

1 Head longer than wide; antennal segments III and IV yellowish; legs brown .... *N. lativentris* (Karny)

1' Head wider than long; antennal segment III yellowish, segment IV brown; legs bicolored .... *N. brevicollis* (Bagnall)

***Nesothrips brevicollis* (Bagnall)**
Oedemothrips (?) brevicollis Bagnall, 1914b: 287-297.
Holotype female, Japan: Okinawa (TMNH)[examined]

Diagnosis. Body brown. Body setae dark. Head wider than long. Postocular setae less than 1.5 times as long as eyes. Antennal segment III yellowish brown, the rest brown; segments III and IV with 2 and 4 sense cones. Pronotal anteroangular setae about as long as anteromarginals. Foretarsi without tooth. Forewings pale with dark, median, longitudinal stripe. Pelta with lateral lobes and with pair of campaniform sensilla. Tube shorter than head.

Mound (1974b) reviewed this species. The color of head and antennae are usually variable in macropterous and brachypterous individuals. Brachypterous females were described by Bagnall (1914b) and Priesner (1935).

Female macroptera. Head wider than long, with few transverse striae posteriorly. Ocelli small. Eyes about 0.35 times as long as head, slightly prolonged ventrally ; posterior ommatidia enlarged. Postocular setae less than 1.5 times as long as eyes, with pointed apices. Cheek setae fine. Antennal segments I, V, VII and VIII brown; apex of segment II and segment III pale; segment IV brown with pale base; segments III and IV with 2 and 4 sense cones. Mouthcone rounded.

Pronotum with distinct median longitudinal line; major setae well developed, with pointed apices; anteroangular setae about as long as anteromarginals; epimeral setae longer than posteroangulars. Forefemora yellow in apical half, brown in basal half; midfemora yellowish, with darker margins; tibiae brownish with pale apices; tarsi yellow each without tooth; outer margin of hindfemora yellow, inner margin dark brown. Forewings pale with light brown, median, longitudinal stripe; 6 to 7 duplicated cilia; subbasal wing setae developed all with pointed apices. Mesonotum transversely reticulate. Metanotum longitudinally reticulate; median setae small.

Pelta with lateral lobes; reticulate; pair of campaniform sensilla present. Abdominal tergites II to VII with 1 pair of wing retaining setae; lateral setae with pointed apices. B1 setae of tergite IX about 0.5 times as long as tube. Tube dark brown; apex light brown, constricted, shorter than head. Anal setae developed.

Male macroptera. General structure and color similar to female. Forefemora greatly enlarged; foretarsi each with tooth.

Material examined. 12 females, 4 males, VISCA, Baybay, Leyte, on yellow alder, 13-V-1987, C. P. Reyes; 1 male, Agko, Mt. Apo, on flower of everlasting, 5-V-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 67): The known range of this species extends from India eastward in the Indo-Australian Archipelago to the Pacific Islands. In the Philippines, this species is known from the islands of Visayas and Mindanao. PHILIPPINES: Visayas: Leyte; Mindanao: North Cotabato. JAPAN. TAIWAN. INDONESIA: Java. AUSTRALIA. INDIA. FIJI. U.S.A.: Hawaii. RODRIGUES IS. REUNION. MAURITIUS.

Hosts. yellow alder, flower of everlasting, grass, dry twigs, dry twigs of *Lantana* sp., leaves, *Nicotiana tabacum*, *Leucaena* sp., *Desmanthus* sp., *Prosopis pallida* litter, *Phytolacca sandwicensis*, *Pipturus albidus*, *Broussaisia arguta arguta*, *Neraudia melastomaefolia parvifolia*, *Bidens* sp., beating dead branch, mantid egg mass, *Pluchea odorata* litter, grass beatings, partly dried *Cyperus rotundus*, dead twigs, fruits and flowers of *Morus nigra*, pineapple, within dried fruit, foliage of *Pluchea indica*, hollow twigs, flowers of pineapple, rose flowers, *Desmanthus virgatus*, *Sida* spp., *Cynodon dactylon maritimus*, *Prosopis pallida* litter, *Metrosideros collina polymorpha*, *Leucaena leucocephala*. In Hawaii, this species is common in leaf litter in the dry lowland (Sakimura, 1971).

Nesothrips lativentris (Karny)
Rhaebothrips lativentris Karny, 1913c: 129.
Holotype male, Taiwan: Anping (**SMFG**)[examined]
Rhaebothrips lativentris Karny; Sakimura, 1971: 397.

Diagnosis. Body brown to blackish brown. Body setae dark. Head longer than wide. Postocular setae about 1.5 times as long as eyes. Antennal segments III and IV with 2 and 4 sense cones. Pronotal anteromarginal setae longer than anteroangulars. Foretarsal tooth present, variable in size. Forewings pale, with dark, median, longitudinal stripe. Pelta with lateral lobes and with pair of campaniform sensilla. Tube slightly shorter than head.

Other than the size of the wings, there is no other significant structural difference between macropterous and brachypterous females of *N. lativentris*, however, brachypterous males have somewhat longer antennae than macropterous individuals (Priesner, 1935). Mound (1974) reviewed this species.

Male macroptera. Head longer than wide; transversely reticulate. Ocelli small. Eyes about 0.25 times as long as head; slightly prolonged ventrally. Postocellar setae well developed. Postocular setae about 1.5 times as long as eyes and pointed apically. Cheek setae fine. Antennae more than 2.0 times as long as head; segment I, base of II, and segments VI to VIII dark brown; apex of II pale; III to V yellowish brown; apical quarter of IV, base of V pale; segment III more than 3.5 times as long as wide, largely yellow or yellowish brown, with 2 slender sense cones; segment IV with 4 sense cones. Mouthcone rounded.

Pronotum small, with distinct median longitudinal line; major setae well developed, almost pointed apically; anteromarginal setae longer than anteroangulars; midlateral setae about 0.7 times as long as epimerals; posteroangular setae longer than epimerals. Bases and apices of femora yellowish brown; tibiae and tarsi yellowish brown or light brown; forefemora enlarged; foretarsal tooth variable in size. Forewings pale, with dark, median, longitudinal stripe; 13 to 21 duplicated cilia; subbasal wing setae well developed; setae S3 longest, with pointed apices. Meso and metanota reticulate.

Pelta with lateral lobes; reticulate; pair of campaniform sensilla present. Abdominal tergites II to VII each with 1 pair of wing retaining setae. Lateral setae on tergites III to VIII light brown to yellowish. B1 setae of tergite IX about as long as tube or shorter. Tube brown; apex light brown; slightly shorter than head. Anal setae well developed.

Female macroptera. Similar to male in structure. Foretarsal tooth absent. Pronotum about as long as head.

Material examined. 3 males, 4 females, 29 immatures, Victorias, Negros Occidental , dry pods of *Hibiscus* sp., "dalopang", dead stems of *Carica papaya*, 1927-1929, W.D.Pierce (Moulton Coll.); 3 males, 2 larvae, Los Banos, Laguna, on leeks, 9-VII-1931, I.D. Dobrosky (Moulton Coll) (**CASC**); 2 females, 1 male, Putinglupa, Calamba, Laguna, on *Leucaena leucocephala*, 5-II-1983, C. P. Reyes; 1 female, Manggahan, Dolores, Quezon, host unknown, 9-III-1987, C. P. Reyes; 1 male, UPLB, Los Banos, Laguna, on *Glycine max*, 9-VII-1984, M. Alba; 1 male, Magsaysay, Talibon, Bohol, 21-XII-1983, L. C. Raros; 1 female, VISCA, Baybay, Leyte, sweeping grass, 12-V-1987, C. P. Reyes; 1 female, 1 male, Sipit Saburan, Puerto Gallera, Oriental Mindoro, on leaves of *Manihot* sp., 20-VI-1987, C. P. Reyes (**CPRC**); 1 male, Los Banos, Laguna. on *Ricinus communis*, 8-XI-1978, A. Barrion (**IRRI**).

Distribution (Fig. 67). The known range of this species extends from Australia to Pacific Islands and northward to North and South America. In the Philippine Archipelago, this species is known from the islands of Luzon and Visayas. PHILIPPINES: Luzon: Los Banos, Laguna; Putinglupa, Calamba; Laguna; Manggahan, Dolores, Quezon; Visayas: Victorias, Negros Occidental; Talibon, Bohol; VISCA, Baybay, Leyte; Puerto Gallera, Oriental Mindoro. TAIWAN. CAROLINE IS: Ponape. GUAM. AUSTRALIA: Queensland. SEYCHELLES.

MAURITIUS. INDONESIA: Java. JAPAN. SAIPAN. NEW GUINEA. MALAYSIA. SOLOMON IS.. U.S.A.: Hawaii; Florida. SAMOA. JAMAICA. CAYMAN IS. TRINIDAD. PUERTO RICO. CUBA. DOMINICAN REPUBLIC. PANAMA. BAHAMAS. VIRGIN IS. LORD HOWE IS.

Hosts. leeks, dry pods of "okra", 'dalopang", dead stems of *Carica papaya, Ricinus communis, Leucaena leucocephala,Glycine max*, sweeping grass, leaves of *Manihot* sp., in tunnel made by *Cylas formicarius*, *Cassia occidentalis*, *Gossypium* sp., in channels of *Xyleborus coffeae* on coca, seeds of *Corchorus* sp., under bark of decaying *Hibiscus tiliaceus*, grass, leaves of *Elephantopus apicatus*, in old stems of *Ipomoea tuberosa*, in dried and hollow stem of *Carica papaya*, in dry pods of *Cajanus cajan*, *Gossypium* sp., dry pods of *Leucaena glauca*, galleries of caterpillar on *Canavalia ensiformis*, under bark, palm stump, ground moss of forest, dry twigs, dead wood. In Hawaii, *N. lativentris* breeds in leaf litter or in the hollows of dried stems, twigs, seed pods and fruit in the lowlands, especially in dry forest areas (Sakimura, 1977).

Genus *Paractinothrips* Mound and Palmer

Paractinothrips Mound and Palmer,1983: 85-86.
Type species: *Paractinothrips peratus* Mound and Palmer, by monotypy.

Diagnosis. Head long, with prolongation in front of eyes. Preocellar setae well developed. Postocular and middorsal setae elongate and stout. Antennae 8-segmented; segment I with an elongate dorsal seta; segment III shorter than segment IV; segment VIII slender; segment III with 2 sense cones; IV with more than 2 sense cones. Cheek setae shorter and stout. Maxillary stylets wide apart. Mouthcone broadly rounded.

Pronotum with major setae well developed; anteroangular and midlateral setae fairly close together; epimeral sutures incomplete. Praepectal plates not developed. Femora with several, stout setae; foretarsal tooth absent in both sexes . Forewings slender, without duplicated cilia. Metanotum without campaniform sensilla. Metathoracic episternum swollen, with series of setae; metasternopleural sutures absent.

Pelta broad. Abdominal tergites III-VII each with 3 or 4 pairs of fan-shaped, wing retaining setae; posteroangular setae arising from 2 pairs of tubercles. B setae on tergite IX short. Tube elongate, with many fine setae. Sternites each with more than one row of discal setae. Sternites each with more than one row of discal setae.

This is a monobasic genus from the Orient. *Paractinothrips* spp. are closely related to those of *Neatractothrips* Mound and Palmer. Adults of *Paractinothrips* differ from those of the latter in the shape of their antennal segments and in their slender wings (Mound and Palmer, 1983).

Paractinothrips peratus Mound and Palmer
Paractinothrips peratus Mound and Palmer, 1983: 86.
Holotype male, Malaysia: Kuala Lumpur (**TMNH**) [examined]

Diagnosis. Body brown with red internal pigment. Body setae pale. Head rectangular with anterior prolongation and numerous long, stout setae each borne on tubercle. Eyes with enlarged posterior ommatidia. Antennal segments III and IV with 2 and 4 sense cones respectively. Cheek setae numerous, stout and dark. Antennal segment I with dorsal seta extending to apex of segment II. Pronotal major setae well developed, each borne on tubercle. Legs generally brown. Forewings without duplicated cilia. Pelta broad with lateral lobes. Tube constricted at apex and with numerous lateral setae.

Male macroptera. Head about 2 times as long as wide, with anterior prolongation and with numerous long, stout setae, each borne on tubercle. Eyes with enlarged posterior ommatidia. Postocular setae long, stout, expanded at apex. Cheek setae numerous, stout and dark. Antennal segment I with dorsal seta extending to apex of segment II; segments III and IV with 2 and 4 sense cones respectively, each with long, slender, dark setae with expanded apices; segments III to VI and basal half of VII yellow, apical half of VII brown. Mouthcone rounded.

Pronotum with complex sculpture medially; major setae well developed, each borne on a tubercle; anteroangular setae longer than anteromarginals; midlateral setae close to anteroangulars; epimeral setae longer than posteroangulars. Legs brownish; apices of tibiae yellow; forefemora each with at least 6 stout setae each borne on a tubercle; inner margin with 1 or 2 stout setae; foretarsi without tooth. Forewings slender, slightly shaded with brown, with dark, median, longitudinal stripe; duplicated cilia absent. Mesonotum with 2 pairs of stout setae similar in form to those on metanotum.

Pelta broad, with lateral lobes. Abdominal tergite I with stout setae. Tergites III to VII each with 3 or 4 pairs of fan-shaped wing retaining setae; posterolateral angles each with 4 setae placed close together. B1 setae of tergite IX short, placed close together. Tube long, constricted apically; lateral setae numerous, emerging at an angle of about 30 degrees.

Female macroptera. Similar to male in structure and color

Material examined. 13 females, 18 males, Quezon National Park, on dead leaves of wild Palmaceae, 16-VIII-1979, S. Okajima (**TMNH**).

Distribution (Fig. 67). The known range of this species extends from Malaysia to the Philippine Archipelago. in the Philippines, this species is known from the island of Luzon. PHILIPPINES: Luzon: Quezon National Park. MALAYSIA: Kuala Lumpur.

Hosts. dead leaves of wild Palmaceae, dead branches

Genus *Peltariothrips* Mound and Palmer

Peltariothrips Mound and Palmer, 1983: 59-60.
Type species: *Peltariothrips insolitus* Mound and Palmer by monotypy.

Diagnosis. Head slightly wider than long, bearing an ommatidium-like structure ventrolaterally in posterior third on either side, narrowed at base. Preocellar and postocellar setae short; postocular setae 2 pairs, subequal. Antennae 7- segmented, suture between segments VII-VIII incomplete; segment III shorter than IV, with 2 sense cones on III and 4 on IV. Cheek setae 5-6, spine like. Maxillary stylets retracted into head capsule almost to level of compound eyes and fairly wide apart.

Pronotum short, with major setae well developed. Praepectal plates small. Foretarsal tooth present in both sexes. Forewings broad, with 10 duplicated cilia; median metanotal setae slender. Metanotum without campaniform sensilla. Metathoracic sternopleural sutures absent.

Pelta triangular, with posterior margin concave. Anterior margin of abdominal tergite II protruding onto pelta. Tergites II-VII each with 1 pair of wing retaining setae. Sternites each with transverse row of discal setae; median sternites of male each with pair of reticulate areas laterally. B1 setae of tergite IX about 0.8 times as long as tube. Tube with sides straight and tapered posteriorly, without prominent lateral setae.

Peltariothrips adults are dark brown and distinguishable by their 7-segmented antennae and triangular pelta with concave posterior margin. Mound and Palmer (1983) considered this genus to be closely related to *Machatothrips* Bagnall. This is a monobasic genus.

Peltariothrips insolitus Mound and Palmer
Peltariothrips insolitus Mound and Palmer, 1983 : 60.
Holotype female, Singapore: Singapore City (TMNH)[examined]

Diagnosis. Body dark brown. Head widest behind eyes. Postocular setae shorter than eyes, knobbed at apices. Cheek setae spine-like. Antennal segment I whitish yellow; segments III and IV with 2 and 4 sense cones respectively. Pronotal posteroangular setae minute; epimeral setae stout. Foretarsi each with triangular tooth. Forewings with 10 duplicated cilia. Pelta triangular with concave posterior margin and a pair of campaniform sensilla. Tube about as long as head.

According to Mound and Palmer (1983) the production of the mesothoracic spiracle into a dentate structure in this species is not found in any other genus of Macrothripina. One male from Mt. Apo is brachypterous with greatly enlarged spiracular processes.

Female macroptera. Head slightly wider than long; widest behind eyes, narrow towards base. Eyes about 0.25 times as long as head. Preocellar and postocellar setae short. Postocular setae shorter than eyes, knobbed at apices. Cheek setae 5 to 6 and spine-like. Antennal segment I whitish yellow; segments II to IV golden; V to VI brown apically; segments III and IV with 2 and 4 long, slender sense cones respectively. Mouthcone rounded.

Pronotal anteromarginal setae longer than anteroangulars; posteroangular setae minute; epimeral setae well developed, stout. Femora brown in basal half, pale in apical half; slightly enlarged; foretibiae and all tarsi brownish yellow; foretarsi each with triangular tooth. Forewings shaded with brown, with median dark longitudinal stripe; 10 duplicated cilia. Metanotum smooth; median setae slender.

Pelta triangular, with concave posterior margin; reticulate; pair of campaniform sensilla present. Abdominal tergites II to VII each with 1 pair of wing retaining setae. B1 setae of tergite IX about 0.8 times as long as tube. Tube parallel-sided, about as long as head. Sternites with accessory setae.

Male macroptera. Similar to female in color. Mesothoracic spiracle slightly enlarged and toothed in profile. Abdominal sternites III to V each with pair of reticulate areas anterolaterally.

Material examined. 10 females, 3 males, Agko, Mt. Apo, on *Alpinia* sheath, 2 females, on leaves of Palmae, VIII-1979, S. Okajima; 9 females, Quezon National Park, on dead leaves of Palmae, VII-1979, S. Okajima (**TMNH**).

Distribution (Fig. 67). The known range of this species extends from the Philippine Archipelago to Singapore. In the Philippines, this species is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: Quezon National Park; Mindanao: Agko, Mt. Apo. SINGAPORE.

Hosts. *Alpinia* sheath, leaves of Palmae, dead twigs, on dead *Areca* sp.

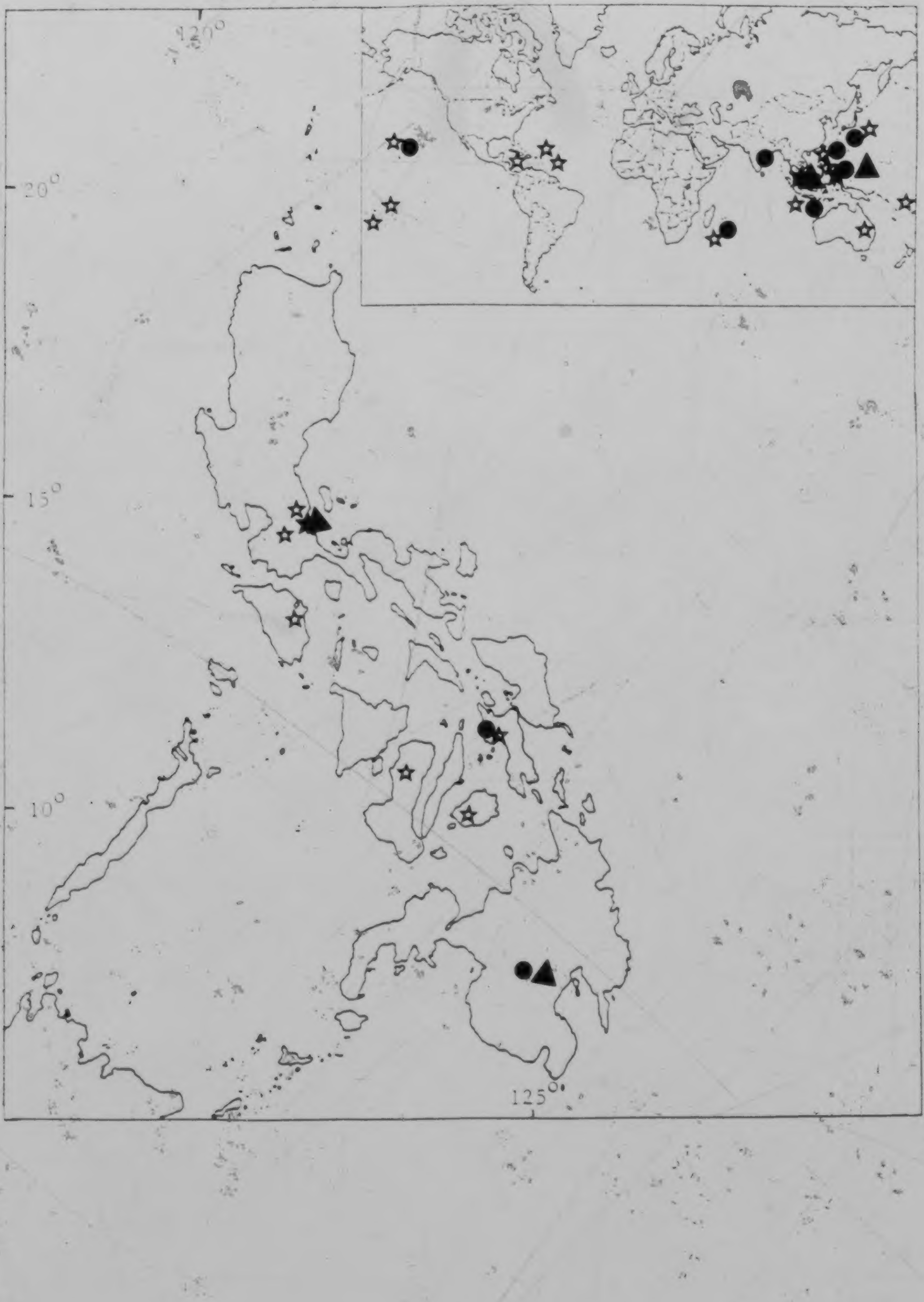
Fig. 67. Distribution of *Nesothrips* species, *Paractinothrips peratus* Mound and Palmer and *Peltariothrips insolitus* Mound and Palmer in the Philippines, and world.

● *Nesothrips brevicollis* (Bagnall)

☆ *Nesothrips lativentris* (Karny),

★ *Paractinothrips peratus* Mound and Palmer

▲ *Peltariothrips insolitus* Mound and Palmer


120°
20°
15°
10°
125°

Subfamily Phlaeothripinae Karny

Phlaeothripinae Karny, 1921: 246.

Diagnosis. Head longer than wide, with short prolongation in front of eyes; with conspicuous sculpture. Three ocelli present in winged but absent in wingless forms. Ocellar setae 3 pairs, one pair well developed. Eyes rounded and multifaceted, sometimes reduced to a few facets, rarely, greatly enlarged; equally developed dorsally and ventrally or prolonged ventrally. Postocular setae usually 1 pair, sometimes 2 pairs. Antennae usually 8- (sometimes 7-) segmented; segment III usually with 1 or more sense cones; IV with 2 or more sense cones. Cheeks usually with series of setae; variably constricted behind eyes or towards base. Maxillary stylets slender, usually 2-3um in diameter, but 3-6um in few species; maxillary guides present and, in form of characteristic maxillary bridge in some taxa. Mouthcone rounded or pointed.

Pronotum entire, reduced to a shield in few taxa; epimeral sutures present or absent; major setae, 5 pairs; midlateral, epimeral and posteroangular setae well developed. Praepectal plates developed, reduced, or absent. Forelegs each with a small or large foretarsal tooth in males or in both sexes; forefemora, tibiae sometimes coxae each with one or more tubercles or teeth. Macropterous or apterous; forewings with none to many duplicated cilia. Meso and metanota reduced or fused in wingless forms. Mesopraesternum usually boat-shaped, sometimes reduced or absent. Metathoracic sternopleural sutures present or absent.

Abdominal tergite I forming variously shaped pelta. Tergites II-VII each with 1 or more pairs of wing retaining setae, these usually sigmoidal but sometimes straight or flattened. Tergite X or tube about as long as head or much longer, and with or without prominent, lateral setae; anal setae short to very long. Females with B2 setae on tergite IX as long as B1 and B3, those in males usually shorter and stout. Glandular areas usually present on sternite VIII of males, sometimes on certain median sternites of males or in both sexes in a few species. Sternal accessory setae usually present.

More than 2,000 species are presently included in this subfamily (Mound and Houston, 1987). Of these, 92 species in 34 genera are known from the Philippines. Phlaeothripines exhibit a wide range of biologies: a few are predatory, some are flower feeding, many are leaf feeding, and almost half are associated with fungi in leaf litter, on dead wood, twigs and leaves (Mound and Houston, 1987).

Key to genera of the Philippine Phlaeothripinae

1 Maxillary stylets less than 4 um in diameter 4

1' Maxillary stylets broader, over 4 um in diameter 2

2(1') Antennal segments VII and VIII more or less fused; metathoracic sternopleural sutures well developed; abdominal sternites IV to VII of male each with reticulate area; epimeral sutures usually complete .... *Holothrips* Karny

2' Antennal segments VII and VIII distinct; metathoracic sternopleural sutures absent; epimeral sutures complete or incomplete.. 3

3(2') Maxillary bridge absent, maxillary stylets long, reaching level of postocular setae, usually moderately close together in middle of head (Fig. 73a) .... *Apelaunothrips* Karny

3' Maxillary bridge present or absent, maxillary stylets short, in form of V in head, or moderately long but not reaching level of postocular setae .... *Dexiothrips* Hartwig

3'' Maxillary bridge present or absent, maxillary stylets long, less than 4um in diameter in few taxa; abdominal tergite VIII with pair of wing retaining setae .... *Phylladothrips* Priesner

4(1) Pronotum reduced to shield; abdominal sternites V to VIII each with scale-like glandular areas in both sexes ....*Plectrothrips* Hood

4' Pronotum entire; abdominal sternites with or without glandular areas 5

5(4') Distance between hindcoxae greater than that between fore and midcoxae; tube and anal setae exceptionally long 6

5' Distance between hindcoxae less than that between fore and midcoxae; tube short or long; anal setae shorter 7

6(5) Head with 1 to 3 pairs of long setae on anterior margin; antennal segments III to V completely fused .... *Stephanothrips* Trybom

6' Head with 1 pair of long setae on anterior margin; antennal segments III to V distinct from each other .... *Bradythrips* Hood and Williams

7(5') Head strongly reticulate or at least reticulate medially 8

7' Head with striation or reticulation 9

8(7) Tube long, pilose; body setae on tubercles; cheeks wide behind eyes (Fig. 92a); winged or wingless .... *Leeuwenia* Karny

8' Tube short, without hairs; body setae expanded, not on tubercles; cheeks parallel-sided behind eyes; winged; antennal segments reticulate .... *Mystrothrips* Priesner

9(7') Antennal segment III with 3 to 15 stout sense cones 10

9' Antennal segment III with 2 to 4 slender or moderately stout sense cones 11

10(9) Cheeks with spines; antennal segment III with 10 to 15 sense cones .... *Ecacanthothrips* Bagnall

10' Cheeks with setae more slender; antennal segment III with 3 to 4 sense cones .... *Hoplandrothrips* Hood

11(9') Abdominal tergite VIII with wing retaining setae 12

11' Abdominal tergite VIII without wing retaining setae 13

12(11) Mesonotum with elongate, triangular band of reticulation (Fig. 107d); cheeks reticulate .... *Prosolomonthrips*, n. gen.

12' Mesonotum without distinct triangular sculpture; eyes prolonged ventrally; antennae long and slender .... *Lizalothrips* Okajima

13(11') Maxillary palpi small, slightly longer than labial palpi; subbasal wing setae minute .... *Psalidothrips* Priesner

13' Maxillary palpi usually larger than labial palpi; subbasal wing setae reduced to well developed 14

14 (13') Compound eyes greatly enlarged and meeting both in front of and behind ocellar triangle; mouthcone very long ....*Macrophthalmothrips* Karny

14' Compound eyes small to large, not contiguous; mouthcone short to moderately long 15

15(14') Forewings parallel-sided; praepectal plates absent 16

15' Forewings constricted medially; praepectal plates present 26

16(15) Posterior ommatidia of each eye enlarged 17

16' Eyes with all ommatidia nearly equal in size 19

17(16) Maxillary stylets close in the middle of head (Fig. 104); metanotum with elongate band of reticulation ....*Praeciputhrips*, n. gen.

17' Maxillary stylets in form of V in the head; metanotum without such reticulation 18

18(17') Maxillary bridge absent; cheek setae strong (Fig. 110a) .... *Rosingothrips*, n. gen.

18' Maxillary bridge present; cheek setae fine (Fig. 78a) ..... *Gemmathrips*, n. gen.

19(16') Forefemora enlarged; foretarsi each with tooth in male 20

19' Forefemora slender, sometimes enlarged; foretarsal tooth present or absent 21

20(19) Head constricted at base; cheeks with spines (Fig. 69a); foretibiae each with apical tooth (Fig. 69d); sense cones on antennal segments III and IV slender; maxillary bridge present .... *Amphidoxothrips*, n. gen.

20' Head almost parallel-sided; cheeks with fine setae; foretibiae unarmed; sense cones on antennal segments III and IV moderately stout; maxillary bridge absent .... *Proaliothrips*, n. gen.

21(19') Postocular setae 2 pairs (Fig. 68a); eyes slightly prolonged ventrally .... *Adelphothrips* Priesner

21' Postocular setae 1 pair; eyes not prolonged ventrally 22

22(20') Maxillary stylets close in the middle of head (Fig. 109a); pronotal major setae developed, with knobbed apices ....*Psephenothrips*, n. gen.

22' Maxillary stylets in form of U in the head; pronotal major setae with blunt, pointed or dilated apices 23

23(22') Head short; antennal segments slender with setiform sense cones .... *Eugynothrips* Priesner

23' Head longer; antennal segments and sense cones moderately robust to elongate and slender 24

24(23') Forefemora enlarged in males (female unknown); foretarsi each with moderately developed tooth .... *Leptoliothrips* Moulton

24' Forefemora not enlarged; foretarsi each with or without small tooth 25

25(24') Pronotum with twisted striae; mouthcone broadly rounded (Fig. 80a); head and body length various .... *Gynaikothrips* Zimmermann

25' Pronotum with indistinct striae; mouthcone rounded or pointed (Figs. 94a, 95a); head longer than wide .... *Liothrips* Uzel

26(15') Head constricted at base; cheeks with developed setae 27

26' Head gradually narrowed towards base; cheeks nearly smooth 28

27(26') Mouthcone long and pointed; cheeks with fine setae (Fig. 75a) .... *Dolichothrips* Karny

27' Mouthcone short and rounded; cheeks with spines (Fig. 99a) .... *Mesothrips* Zimmermann

28(26') Forefemora with armatures along the inner margins 29

28' Forefemora without armatures 30

29(28) Praepectal plates wider than long; antennal segment IV with 4 or 5 sense cones
.... *Androthrips* Karny

29' Praepectal plates longer than wide; antennal segment IV with 2 or 3 sense
cones .... *Podothrips* Hood

30(28') Maxillary bridge absent; praepectal plates present or absent
....*Antillothrips* Stannard

30' Maxillary bridge present; praepectal plates developed 31

31(30') Body usually smaller and brown, bicolored in few taxa
.... *Haplothrips* Amyot & Serville

31' Body bicolored, uniformly brown in few taxa; body larger 32

32(31) Foretarsi each with or without claw directed forward; pelta triangular (Fig. 90d)
.... *Karnyothrips* Watson

32' Foretarsi each with tooth not directed forward; pelta hat-shaped (Fig. 105d)
.... *Praepodothrips* Priesner & Seshadri

Genus *Adelphothrips* Priesner
Adelphothrips Priesner, 1953: 374-375.
Type species: *Gynaikothrips tristis* Karny, by original designation

Diagnosis. Head longer than wide, scarcely or distinctly narrowed towards base. Eyes large, prolonged ventrally in few taxa. Postocular setae 2 pairs, not arranged in row. Antennae 8-segmented, moderately long with rather slender sense cones; segment VIII sometimes slightly constricted at base; segment III with 1 sense cone; segment IV with 2 or 3 sense cones. Mouthcone narrowly rounded to nearly pointed.

Pronotum shorter than head, with major setae well developed; epimeral sutures incomplete. Praepectal plates absent. Legs moderately long, forefemora not or slightly thickened in both sexes, foretarsi each without tooth. Forewings parallel-sided, with duplicated cilia.

Pelta triangular. Abdominal tergites II to VII each with 2 pairs of wing retaining setae. Tube about as long as head or shorter, evenly conical.

Adults of *Adelphothrips* species resemble those of *Liothrips* Uzel in number of sense cones on antennal segments III and IV. They can be distinguished from those of the latter by the following characters: eyes slightly prolonged ventrally; forefemora enlarged in some males; and with the 2 pairs of postocular setae not arranged in a row. Two species are included in this genus (Priesner, 1953). Two species including one new to science are known from the Philippines.

Key to Philippine species of *Adelphothrips* Priesner

1 Major setae of pronotum expanded apically (Fig. 68c); antennal segment VIII constricted at base; forewings pale .... *D. longisetosus*, n. sp.

1' Major setae of pronotum blunt apically; antennal segment VIII broad at base; forewings slightly shaded with brown .... *D. vernoniae* Priesner

***Adelphothrips longisetosus*, n. sp.**
Holotype female, Philippines: Luzon: Mudspring, Mt. Makiling (**UPLB**)
Figure 68a, b, c, d

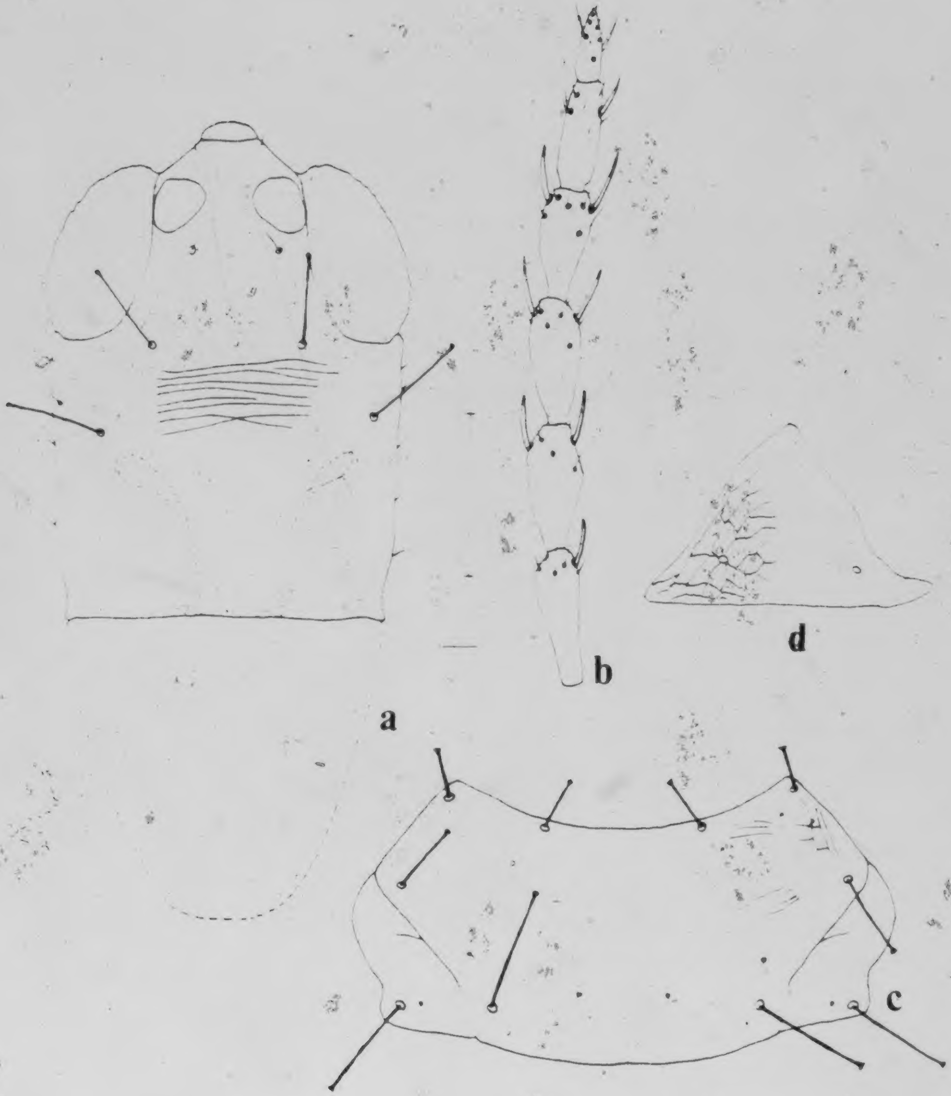
Diagnosis. Brown species. Body setae brown, with expanded apices. Head longer than wide. Eyes slightly prolonged ventrally. Postocular setae of equal length, with expanded apices. Cheek setae slender. Antennal segments III to VI yellow; segment III more slender than IV; segment III with 1 outer sense cone; IV with 1 inner and 1 outer sense cones. Major setae of pronotum well developed, with expanded apices; epimeral and posteroangular setae subequal. Legs bicolored. Forewings pale, with brown, median longitudinal stripe. Pelta triangular, reticulate. B1 setae of tergite IX shorter than tube, pointed at apex. Tube shorter than head.

Adults of this species differ from those of *A. vernoniae* Priesner in the following characteristics: forewings pale; antennal segments moderately robust; III to VI yellow; III and IV with 1 and 2 sense cones respectively; pronotal major setae with expanded apices; and postocular setae of equal length.

Female macroptera. Head longer than wide, slightly constricted at base; transversely striate (Fig. 68a). Ocellar hump prominent. Ocelli large. Eyes slightly prolonged ventrally, about 0.3 times as long as head. Postocular setae 2 pairs; developed, of equal length, with expanded apices. Cheeks setae slender. Antennal segments I and II brown, II pale at apex; III to VI yellow; VII pale basally, brown apically; VIII greyish brown, constricted at base; segment III more slender than IV; segment III 1 outer sense cone; IV with 1 inner and 1 outer sense cones respectively (Fig. 68b). Mouthcone rounded (Fig. 68a).

Pronotal major setae well developed, with expanded apices; anteromarginal setae longer than anteroangulars; epimeral setae longer than posteroangulars (Fig. 68c). Femora brown; foretibiae brownish on basal third, pale on apical two-thirds; mid and hindtibiae pale apically; tarsi yellow. Forewings pale, with brown, median, longitudinal stripe ; 8 to

Fig. 68. *Adelphothrips longisetosus*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta


b
d
a
c

10 duplicated cilia; subbasal wing setae well developed, shaded and with expanded apices. Mesonotum transversely reticulate. Metanotum longitudinally striate.

Pelta triangular, reticulate; pair of campaniform sensilla present (Fig. 68d). Abdominal tergites reticulate; accessory setae few. Tergal lateral setae well developed, with expanded apices. Tergites II to VII with 2 pairs of wing retaining setae. B1 setae of tergite IX shorter than tube, pointed apically. Tube conical; dark brown basally, light brown apically, shorter than head. Anal setae developed.

Dimensions (holotype female; um). Body length (extended 2611.2. Head length 278.8, median width 207.4; dorsal eye length 102; postocular setae length: pair I68; pair II 68; antennal segments length: I 42.5; II 59.5; III 79.9; IV 78.2; V 76.5; VI 69.7; VII 62.9; VIII 45.9. Pronotum length 173.4, median width 299.2, major setae length: aa 37.4; am 47.6; ml 68; pa 93.5; ep 103.7. Tergite IX setae length: B1 210.8; B2 241.4; B3 200.6. Tube length: 251.6.

Type data. **Holotype** female, PHILIPPINES: Mudspring, Mt. Makiling, on unknown tree, 27-VI- 1987, C. P. Reyes (**CPRC**).

Male. Unknown.

Material examined. Holotype female. Other. 1 female, Mudspring, Mt. Makiling, on curled leaf of Lauraceae, 27-VI-1987, C. P. Reyes (**CPRC**).

Etymology. Longisetosus is a Latin word meaning "long setae" in reference to the well developed major pronotal setae of these thrips. .

Distribution (Fig. 70). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Mudspring, Mt. Makiling.

Hosts. This species produce galls on leaves of a Lauraceous plant.

***Adelphothrips vernoniae* Priesner**
Adelphothrips vernoniae Priesner, 1953: 376-377.
Syntype female, Indonesia: Java: Tjibodas (**SMFG**) [examined]

Diagnosis. Body brownish black to black. Body setae dark. Head rectangular, slightly narrowed towards base. Postocular setae 2 pairs; posterior pair longer. Antennal segments III and IV yellow, III elongate; segment III with 1 outer sense cone; IV with 1 inner and 1 or 2 outer sense cones. Pronotal major setae well developed, with blunt apices; posteroangular setae about as long as epimerals. Forewings lightly shaded with brown, with numerous duplicated cilia. Pelta triangular, faintly reticulate. Laterodorsal setae of tergites well developed, dark, with blunt apices. Tube shorter than head. This is the first record of *A. vernoniae* in the Philippines.

Female macroptera. Head rectangular, about 2 times as long as wide, slightly narrowed towards base; reticulate. Ocellar hump small. Cheeks slightly constricted behind eyes. Eyes about 0.35 times as long as head. Postocular setae with anterior pair placed closer together than posterior pair; posterior pair longer. Antennae less than 1.5 times as long as head; segments I and II brown, with II pale apically; III and IV yellow, III elongate; V pale basally, brownish apically; VI pale basally, brownish apically; VII and VIII greyish brown; VIII broad at base; segment III with 1 outer sense cone; IV with 1 inner and 1 or 2 outer sense cones. Mouthcone narrowly rounded.

Pronotal major setae developed, dark, with blunt apices; anteromarginal setae longer than anteroangulars; posteroangular and epimeral setae subequal. Legs generally brown; bases of mid and hindfemora pale; tibiae with pale apices; tarsi light brown. Forewings lightly shaded with brown, with dark, median, longitudinal stripe and 12 to 21 duplicated cilia; subbasal wing setae developed, dark, with pointed apices. Metascutum with longitudinal reticulation.

Pelta triangular, faintly reticulate, with pair of campaniform sensilla. Abdominal tergites reticulate; laterodorsal setae developed with blunt apices; outer lateral setae of tergite

VII with nearly pointed apices. Tergites II to VII with 2 pairs of wing retaining setae. B1 setae of tergite IX about as long as tube, blunt to nearly pointed apically. B2 and B3 setae pointed apically. Tube dark brown basally, pale apically, shorter than head. Anal setae well developed.

Male macroptera. Similar to female in general structure and color. Mouthcone nearly pointed. B1 setae of tergite IX nearly pointed at apex; B2 setae shorter, broader.

Material examined. 5 females, 2 males, Mt. Kitanglad, Bukidnon, on *Macaranga* sp., 26-V-1984, S. G. Reyes; 1 female, 3 males, Anuling, Pamocotan, Zamboanga, on *Alphitonia* sp., 11-VII-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 70). The known range of this species extends from the Philippines to the Indonesian Archipelago. In the Philippine Archipelago, this species is known from the island of Mindanao. PHILIPPINES: Mindanao: Mt. Kitanglad, Bukidnon; Anuling, Pamocotan, Zamboanga. INDONESIA: Tjibodas, Java.

Hosts. *Macaranga* sp., *Alphitonia* sp., leaf gall and in marginal leaf curls of *Vernonia arborea*

Genus *Amphidoxothrips* n. gen.

Type species: *Amphidoxothrips armatus* n. sp.

Diagnosis. Head longer than wide, strongly constricted at base. Ocellar setae minute. Postocular setae 1 pair, well developed, shorter than length of eye. Cheeks with spine-like setae. Antennae 8-segmented; sense cones rather long; segment III thin and longer than segment IV, with 1 sense cone; segment IV with 3 sense cones. Maxillary stylets retracted into head capsule almost to level of postocular setae, fairly close in middle of head. Maxillary bridge present. Mouthcone narrowly rounded.

Pronotum with major setae with blunt apices; inner pair of posteromarginal setae vestigial; epimeral sutures complete. Praepectal plates absent. Mesopraesternum boat-shaped. Forefemora enlarged and with small spine-like setae; foretibiae enlarged with stout tooth on inner apical margin; foretarsi each with long, triangular tooth. Forewings parallel-sided, with duplicated cilia.

Pelta triangular, reticulate, with pair of campaniform sensilla. Abdominal tergites II-VII each with 2 pairs of wing retaining setae. B1 setae on tergite IX shorter than tube; B2 setae thickened, and shaded. Tube shorter than head. Sternite VIII without glandular areas in males.

Members of *Amphidoxothrips* n. gen. are similar to those of *Mesothrips* Zimmermann and *Rosingothrips* n. gen. in the following characteristics: head with basal neck-like constriction; cheeks with dark spines; and maxillary bridge present (not those of *Rosingothrips*). They differ from species of *Mesothrips* in having a boat-shaped mesopraesternum, praepectal plates absent, forewings parallel-sided, and antennal segment III with only 1 sense cone. Adult *Mesothrips* have constricted forewings and with 2 or 3 sense cones on antennal segment III. The number of sense cone on antennal segment III is similar to those in *Rosingothrips*, *Liothrips* Uzel and in species of related genera.

Rosingothrips have enlarged posterior ommatidia in their eyes which are prolonged ventrally.

Etymology. Amphidoxo is a Greek word meaning "dubious" (*Amphidoxothrips* = dubious thrips) in reference to the doubtful resemblance of these thrips to *Mesothrips*.

***Amphidoxothrips armatus*, n.sp.**
Holotype male, Philippines: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro (UPLB).
Figure 69a, b, c, d, e

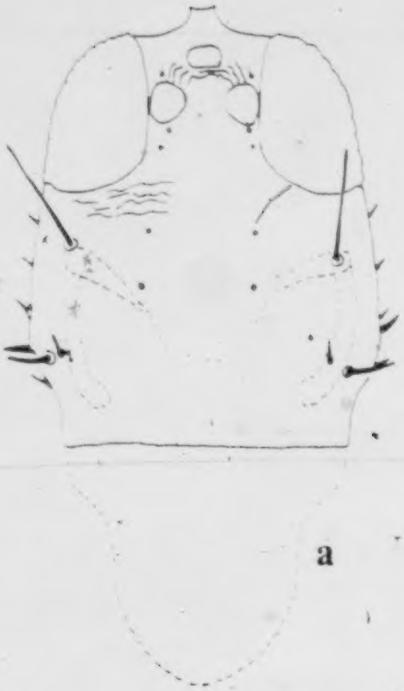
Diagnosis. Body brown. Head constricted at base. Cheeks with spines. Antennal segment III yellow; segment III with 1 outer sense cone; IV with 1 inner and 2 outer sense cones. Pronotal major setae with blunt apices; posteroangular and epimeral setae subequal. Forefemora enlarged; foretibiae and tarsi each with tooth. Forewings pale, with duplicated cilia. Pelta irregularly triangular. Abdominal tergal lateral setae pale, with blunt apices.

Members of this species possess characters intermediate between those of supposedly different lines: the *Mesothrips-Haplothrips* group (forewings constricted medially; maxillary bridge and praepectal plates present) and the *Gynaikothrips-Liothrips* group (forewings parallel-sided; maxillary bridge and praepectal plates absent). Although this species is known only from the type material, I have little reservation in erecting a new genus for this remarkable thrips.

Male macroptera. Head longer than wide, constricted towards base; transversely striate (Fig. 69a). Postocular setae developed, with blunt apices, shorter than eyes. Cheek setae dark, spine-like, and more robust towards base. Antennae more than 2.0 times as long as head; segments I, II, VII and VIII brown; segment III yellow; segments IV to VI yellow shaded with brown apically; segment III slender, longer than segment IV; segments III with 1 outer sense cone; IV with 1 inner and 2 outer sense cones (Fig. 69b). Mouthcone narrowly rounded (Fig. 69a).

Pronotum slightly reticulate; major setae with blunt apices; midlateral setae longer than anteromarginals; posteromarginal setae minute to vestigial; posteroangular setae about as long as epimerals (Fig. 69c). Forefemora enlarged, with numerous, short, spine-like setae, each on small tubercle; foretibiae enlarged; inner apical margin of each with tooth; foretarsi each with long, triangular tooth (Fig. 69d). Forewings pale, with 19 duplicated cilia. Meso and metanota reticulate.

Fig. 69. *Amphidoxothrips armatus*, n. sp., male holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Right forefemur, foretibia and foretarsus e. Pelta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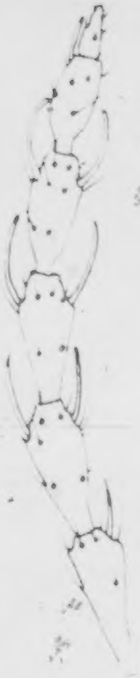
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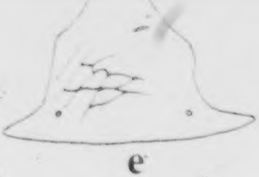
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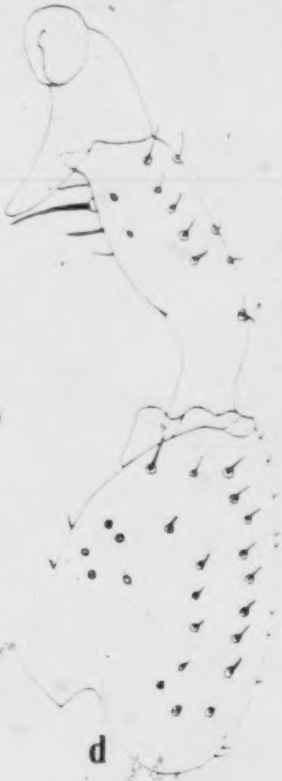
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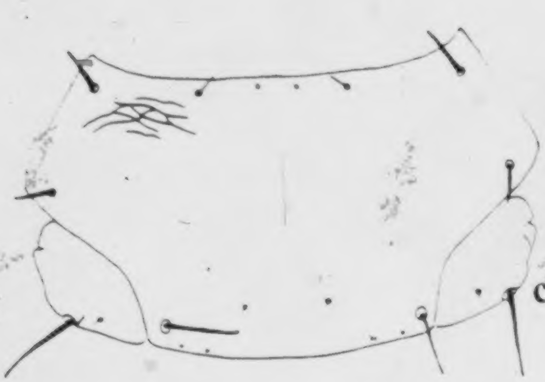
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Pelta irregularly triangular, reticulate; pair of campaniform sensilla present (Fig. 69e). Tergal lateral setae pale, well developed, with blunt apices. Abdominal tergites II to VII each with 2 pairs of slightly curved wing retaining setae. B1 setae of tergite IX pale, slender, with blunt apices, shorter than tube; B2 setae moderately stout, short, dark, with blunt apices. Tube shorter than head, dark brown, with light brown apex. Anal setae well developed.

Dimensions (holotype male; um). Body length (extended) 2652. Head length 258.4, median width 205.4; dorsal eye length 96.9; postocular setae length 64.6; antennal segment length: I 35.7; II 57.8; III 81.6; IV 76.5; V 76.5; VI 69.7; VII 59.5; VIII 32.3. Pronotum length 176.8, median width 302.6; major setae length: aa 37.4; am 20.4; ml 39.1; pa 66.3; ep 66.3. Tergite IX setae length: B1 139; B2 34; B3 47.6. Tube length: 244.8.

Type data. **Holotype** male, PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro, on leaf of unknown tree, 19-IV-1987, C. P. Reyes (**UPLB**).

Female. Unknown.

Material examined. **Holotype** male only (**UPLB**).

Etymology. Armatus is a Latin word meaning "armed" in reference to the foretibial and foretarsal teeth of this thrips.

Distribution (Fig. 70). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro.

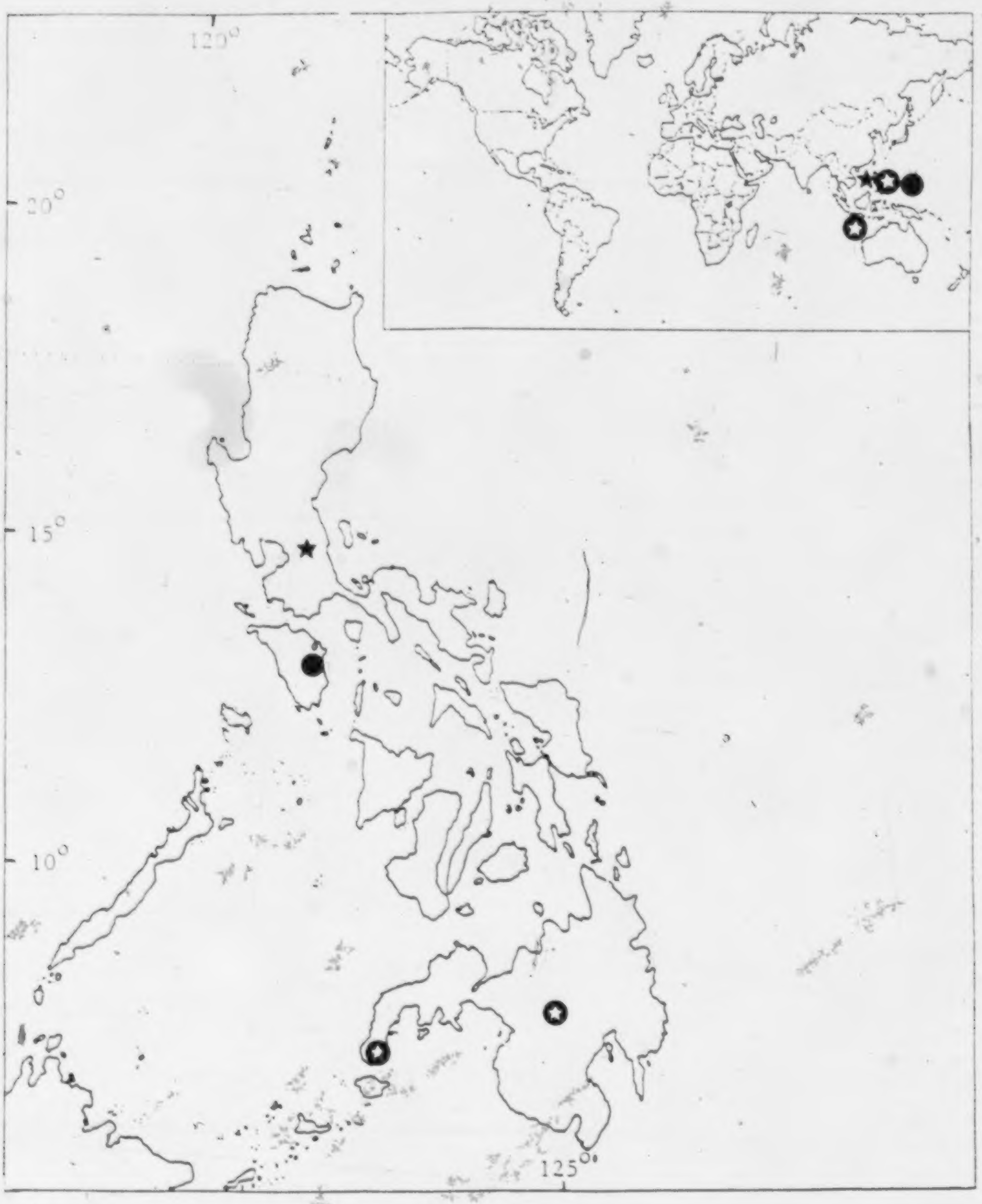
Host. leaf of unknown tree

Fig. 70. Distribution of *Adelphothrips* species and *Amphidoxothrips armatus*, n. sp. in the Philippines, and world.

★ *Adelphothrips longisetosus*, n. sp.

✪ *Adelphothrips vernoniae* Priesner

● *Amphidoxothrips armatus*, n. sp.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Genus *Androthrips* Karny

Androthrips Karny, 1911b: 560
Type species: *Mesothrips melastomae* Zimmermann, by original designation.

Diagnosis. Head longer than wide, slightly constricted towards base. Ocellar setae minute. Postocular setae 2 pairs, well developed. Cheek setae fine. Antennae 8-segmented, segment III with 2 sense cones; segment IV with 4 or 5 sense cones. Mouthcone broadly rounded.

Pronotum with major setae developed; epimeral sutures complete. Praepectal plates present. Mesopraesternum boat-shaped. Forefemora enlarged with basal hump, and with row of small tubercles along inner margins; foretibial tooth broad, blunt and rounded. Forewings constricted medially, with duplicated cilia.

Pelta triangular . Abdominal tergites II-VII each with 2 pairs of wing retaining setae. Body setae long, pale to slightly shaded. Tube conical.

Adults of *Androthrips* species have forefemoral armature similar to that of *Podothrips* Hood. Ritchie (1974) distinguished members of *Androthrips* from those of the latter by the combination: praepectal plates wider than long; forefemora with basal hump and row of small tubercles along inner margins; foretibial tooth broad, blunt, and rounded; segment IV of antennae with 4 or 5 sense cones . In *Podothrips* spp., the praepectal plates are usually longer than wide; foretibial tooth small; antennal segment III with 1 or 2 sense cones and segment IV with 2 or 3 sense cones. There are 13 species included in *Androthrips* (Jacot-Guillarmod, 1979) of which only one species, *A. kurosawai*, is known from the Philippines.

Androthrips kurosawai Priesner
Androthrips kurosawai Priesner, 1940: 407.
Holotype female, Philippines: Los Banos, Laguna (**SMFG**) [examined]

Diagnosis. Body brown. Body setae slender and pale. Eyes moderately large. Postocular setae 2 pairs, posterior pair longer. Antennal segments III to V yellowish; segment III with 2 sense cones; IV with 2 or 4 sense cones. Pronotum strongly widened posteriorly. Femora brown; tibiae and tarsi yellow. Forefemora enlarged, flattened each with distinct, narrow, parallel-sided tooth at base and with several irregular row of fine rounded tubercles on inner margin . Forewings pale, with duplicated cilia. Pelta bell-shaped. Tube shorter than head. This species is endemic to the Philippines.

Female macroptera. Head longer than wide, nearly parallel-sided. Ocelli large, touching inner margins of eyes. Eyes moderately large, more than 0.3 times as long as head. Postocular setae 130 to 138 um long. Cheeks nearly smooth. Antennae more than 1.5 times as long as head; segments I and II, and apices of VI to VIII brown; segments III to V yellow; III and IV with 2 and 4 sense cones respectively; segment VIII slightly constricted basally. Mouthcone narrowly rounded.

Pronotum strongly widened posteriorly; major setae well developed, pale and with expanded apices; epimeral setae longer than posteroangulars. Legs bicolored; femora brown; tibiae and tarsi yellow; forefemora enlarged, flattened, each with distinct narrow, parallel-sided tooth at base and with several irregular row of fine rounded tubercles on inner margin; foretibiae each with flat, small plate at apex; foretarsi each with strong, forwardly directed tooth emerging from broad base. Forewings yellowish brown, with 6 to 15 duplicated cilia; subbasal wing setae well developed, with slightly expanded apices; setae S3 longest. Metanotum reticulate, with well developed, slender, median setae.

Pelta bell-shaped, reticulate. Abdominal tergites with well developed, pale, laterodorsal setae. Tergite II concave medially. B1 setae of tergite IX much longer than B2, with blunt apices; B3 pointed at apex. Tube shorter than head. Anal setae longer than tube. Sternites VI to VIII with robust median posteromarginal setae about 2 times as long as those on sternite II.

Male macroptera. Similar to female in structure. Antennal segment IV shaded with brown at apex; apices of segments V and VI slightly shaded.

Material examined. **Holotype** male, Los Banos, Laguna; in sweep samples, T. Ishii (**SMFG**); 1 female, 1 male, Mudspring, Mt. Makiling, on curled leaf of Lauraceae, 27-VI-1987, C. P. Reyes; 1 female, Forestry, UPLB, Los Banos, Laguna, on leaves of *Ficus* , 24-V-1985, V. P. Gapud; 1 female, La Granja, La Carlota, Negros Occidental, on *Panicum maximum*, 16-V-1985, C. P. Reyes; 3 females, 5 males, Anuling, Pamocotan, Zamboanga, on *Ficus* sp., 11-VII-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 71). The known range of this species is confined to the Philippine Archipelago, where it is known from the three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: Los Banos, Laguna; Mudspring, Mt. Makiling; Visayas: Mambucal, Murcia, Negros Occidental; La Granja, La Carlota, Negros Occidental; Mindanao: Anuling, Pamocotan, Zamboanga.

Hosts: in sweep samples, curled leaf of Lauraceae, *Ficus* sp., unknown plant, *Panicum maximum*

Genus *Antillothrips* Stannard

Antillothrips Stannard, 1957: 35-36
Type species: *Antillothrips graminatus* Stannard, by original designation.

Diagnosis. Head somewhat elongate, smooth, with slight depressed area on cheeks behind eyes. Postocular setae well developed, with pointed to expanded apices. Antennae 8-segmented, segment III with 1 or 2 sense cones; segment IV with 2 or 4 sense cones. Maxillary stylets short, barely retracted into head capsule; maxillary bridge absent. Mouthcone broadly rounded.

Pronotum with faint striations; anteromarginal and midlateral setae well developed or vestigial. Praepectal plates present or absent. Forewings constricted at middle, and with or without duplicated cilia. Mesopraesternum developed.

Pelta small, bell-shaped. Abdominal tergites III-VII each with 2 pairs of well developed, wing retaining setae. Tube moderate in length. Anal setae about 1.5 times as long as tube.

Adults of *Antillothrips* are small to medium-sized, bicolored or brown thrips distinguished from those of *Haplothrips* Amyot and Serville and related genera by their short maxillary stylets that are hardly retracted into the head. The genus include 10 known species (Mound and Houston, 1987), one of which *A. cingulatus*, is known from the Philippines.

Antillothrips cingulatus **(Hood)**
Zygothrips cingulatus Hood, 1919c: 80.
Holotype female, Australia: Nelson, North Queensland (**USNM**)[examined].

Diagnosis. Body bicolored. Head, thorax, abdominal tergites VIII, IX and tube brown; tergites I to VII yellow. Body setae pale. Head widest at base. Postocular setae longer than eyes, with expanded apices. Antennal segment III yellow; IV to VI brownish yellow, darkening towards apices. Fore and midlegs bicolored; hindlegs yellow. Forewings yellow, without duplicated cilia. Pelta triangular, weakly developed. Tube conical and shorter than head. This is the first record of *A. cingulatus* in the Philippines.

Female macroptera. Head brown, longer than wide, widest at base, with transverse striae posteriorly. Postocular setae longer than eyes, with expanded apices. Cheeks nearly smooth. Antennal segment I, most of II, and VII and VIII brown; III yellow; IV to VI brownish yellow and darkened towards apices; segment VIII slightly constricted at base. Mouthcone rounded.

Thorax brown; pronotum widened posteriorly and with red subintegumental pigment; major setae developed, with expanded apices; anteroangular setae about as long as anteromarginals; midlateral setae slightly longer than anteroangulars; epimeral setae about as long as posteroangulars. Forefemora and most of midfemora brown, with pale apices; hindlegs yellow; all tibiae and tarsi yellow. Forewings yellow and without duplicated cilia; subbasal wing setae well developed, pale, with expanded apices; setae S3 longest; scale brown. Mesonotum transversely striate. Metanotum weakly striate or nearly smooth medially.

Pelta triangular, weakly developed. Abdominal tergites II to VII yellowish medially, greyish laterally; tergites VIII, IX and tube brown. Tergites II to VII each with 2 pairs of wing retaining setae. B1 setae of tergite IX about as long as tube, with pointed apices. Tube conical, shorter than head. Anal setae well developed.

Male. Not known from the Philippines

Material examined. 1 female, IRRI, Los Banos, Laguna, on *Oryza sativa*, 5-VII-1983, C. Hugo; 1 female, UNP Demofarm, Villarica, Pantabangan, Nueva Ecija, in litter of mixed crops, 25-I-1980, L. Sanchez; 1 female, La Granja, La Carlota, Negros Occidental, sweeping grass, 26-V-1987, C. P. Reyes (**CPRC**).

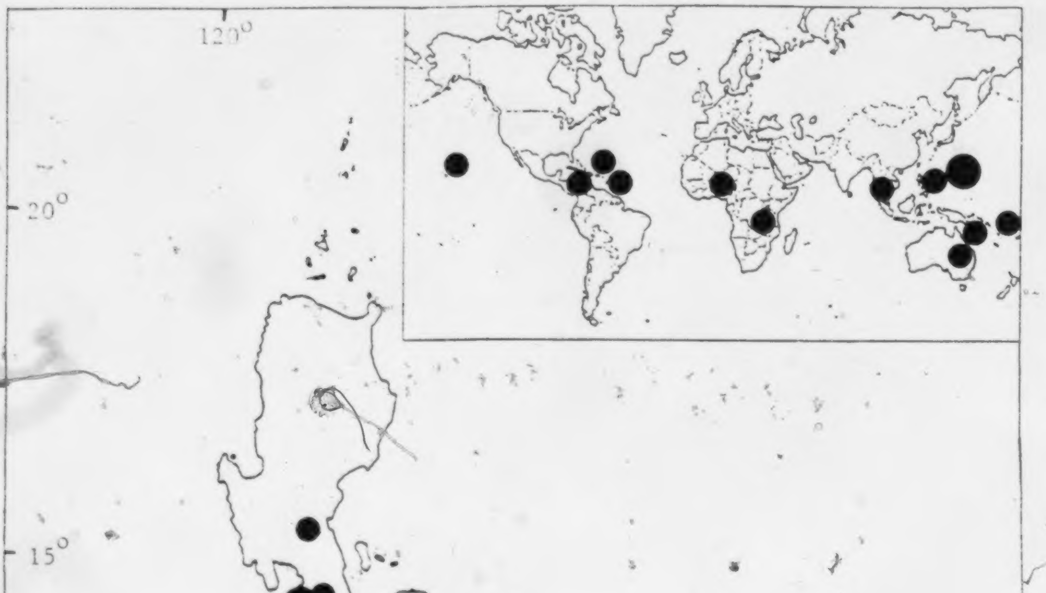
Distribution (Fig. 71). The known range of this species extends from Australia the Pacific Islands and northward to South America. In the Philippine Archipelago, this species is known from the islands of Luzon and Visayas. PHILIPPINES: Luzon: IRRI, Los Banos, Laguna; UNP, Demofarm, Villarica, Pantabangan, Nueva Ecija; Visayas: La Granja, La Carlota, Negros Occidental. THAILAND. AUSTRALIA: Queensland. SOLOMON IS. NEW BRITAIN. U.S.A.: Hawaiian Is, Florida. JAMAICA. PUERTO RICO. TRINIDAD. NIGERIA. TANZANIA.

Hosts. *Oryza sativa*, in litter of mixed crops, sweeping grass, forest, *Musa* sp., *Emilia sagittata*, dead twig of *Myoporum sandwicense*, *Cyperus rotundus*, *Emilia sonchifolia*, grass, matted grasses, *Panicum barbinode*, *Oryza sativa*, short grass, wire grass, sweeping in forest, *Musa* sp., in wind traps

Fig. 71. Distribution of *Androthrips kurosawai* Priesner and *Antillothrips cingulatus* Hood in the Philippines, and world.

● *Androthrips kurosawai* Priesner

● *Antillothrips cingulatus* Hood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Genus *Apelaunothrips* Karny

Apelaunothrips Karny, 1925a: 82.
Type species: *Ophidothrips medioflavus* Karny, by monotypy.

Diagnosis. Head 1.0 to 1.5 times as long as wide; constricted at base. Vertex slightly produced, subconical; postocular setae long, expanded or knobbed apically; cheeks rounded, often subparallel, constricted just behind eyes. Antennae 8-segmented, long, sense-cones slender, setiform, segment VIII constricted at base in few taxa. Maxillary stylets long, closed together in middle of head, 4-6um in diameter. Mouthcone rounded.

Pronotum transverse; major setae developed, expanded at apex; anteroangular setae closed to midlateral setae; epimeral sutures complete; praesternum absent; mesopraesternum developed. Foretibiae and tarsi without teeth. Forewings constricted medially, with duplicated cilia.

Abdomen slender. Pelta bell-shaped or triangular; tergite II with posterior wing retaining setae curved, hook-like. Tube shorter than head.

Adults of *Apelaunothrips* are medium-sized thrips with varied coloration: yellow, brown or bicolored. They are commonly collected in leaf litter and on dead leaves and branches in the tropics. Twenty eight species are included in this genus (Okajima, 1979a, 1984). Of these, 10 species are known from the Philippines (Okajima, 1984). One new species, *A. makilingae*, is described below.

Key to Philippine species of *Apelaunothrips* Karny

1	Antennal segment IV with 3 sense cones	2
1'	Antennal segment IV with 4 sense cones	3
2(1)	Head about 1.5 times as long as broad; eyes not prolonged ventrally	***A. medioflavus*** Karny
2'	Head about as long as wide; eyes prolonged ventrally ..	*A. cephalicus* Okajima
3(1')	Pelta hat-shaped; body bicolored	4
3'	Pelta irregularly bell-shaped or subtriangular; body brown	7
4(3)	Antennal segment VIII constricted at base; head brown	5
4'	Antennal segment VIII not constricted as base; head yellow with brown cheeks	6
5(4)	Tube dark brown; abdominal tergites III and IV brown; foretarsi each with a small tooth in males	*A. fasciatus* Okajima
5'	Tube and abdominal tergite III yellow; foretarsi without tooth in males	***A. makilingae***, n.sp.
6(4')	Mouthcone long, slightly pointed; head about 1.25 as long as wide	*A. rostratus* Okajima
6'	Mouthcone short, rounded; head about 1.1 as long as wide	*A. marginalis* Okajima
7(3')	Head about as long as wide; legs bicolored	8
7'	Head longer than wide; legs brown or bicolored	9
8(7)	Antennal segment VIII constricted at base; all tibiae yellow	***A. simpliceps*** Okajima
8'	Antennal segment VIII not constricted at base; mid and hind tibiae brown with light apices	*A. philippinensis* Okajima
9(7')	Head 1.2 times as long as wide; legs brown	*A. flavicornis* Okajima

9' Head from 1.1 to 1.25 times as long as wide; legs bicolored 10

10(9') Mid and hindtibiae dark brown, with pale apices; pelta without campaniform sensilla .... *A.* sp. 1 Okajima

10' Mid and hindtibiae yellow; pelta with pair of campaniform sensilla .... *A.* sp. 2 Okajima

***Apelaunothrips cephalicus* Okajima**
Apelaunothrips cephalicus Okajima, 1984: 719-720.
Holotype male, Philippines: Luzon: Bicol National Park (**Okajima**)[not examined]

Diagnosis. Body bicolored. Head, pterothorax, and tube brown; prothorax and abdominal tergites I to IX yellow. Head widest across eyes, reticulate laterally. Eyes prolonged ventrally. Postocellar and postocular setae developed, postoculars slightly longer. Antennal segments III and IV with 2 and 3 sense cones respectively. Pronotal major setae developed, with expanded apices. Legs generally yellow, slightly shaded with light brown. Forewings pale grey with duplicated cilia. Tube shorter than head. *A. cephalicus* is known only from the holotype male.

Male macroptera. Head dark brown, about as long as wide, widest across eyes; reticulate laterally; distinctly constricted towards base. Ocelli 17 um in diameter; postocellar setae developed, with expanded apices, widely separated. Eyes about 0.5 times as long as head, prolonged ventrally. Postocular setae slightly longer than postocellar setae, with expanded apices. Antennal segments I to III yellow; IV to VI brown, with yellow bases; VII and VII brown; segments III and IV with 2 and 3 sense cones respectively. Mouthcone rounded.

Pronotum yellow, reticulate posteriorly; major setae developed, with expanded apices. Legs generally yellow, slightly tinged with pale brown; foretarsi each without tooth. Forewings pale grey, with 4 to 5 duplicated cilia; subbasal wing setae well developed, with expanded apices; setae S2 and S3 subequal. Meso and metanota brown.

Pelta weakly developed, bell-shaped; faintly reticulate. Abdominal tergites yellow. B1 setae of tergite IX about as long as tube, weakly expanded at apex. Tube about 0.5 times as long as head, brown with pale base. Anal setae shorter than tube.

Female. Unknown

Material examined. I was not able to borrow Okajima's material.

Distribution (Fig. 73). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Bicol National Park.

Host. dead leaves

Apelaunothrips fasciatus Okajima

Apelaunothrips fasciatus Okajima, 1984: 720-721.
Holotype female, Philippines: Luzon: Bicol National Park (**Okajima**)[not examined]

Diagnosis. Body bicolored. Head, thorax, abdominal tergites III, IV and IX, and tube brown; tergite II yellow; tergites VI to VIII brownish yellow. Body setae yellowish. Postocellar and postocular setae short, with expanded apices. Antennal segments III and IV with 3 and 4 sense cones respectively. Pronotal major setae developed, with expanded apices. Forewings greyish, with duplicated cilia. Pelta weakly developed, hat-shaped. Tube shorter than head. This species is known only from the type material.

Female macroptera. Head brown, reticulate; about 1.5 times as long as wide, widest across cheeks, slightly constricted at base. Postocellar setae a little longer than diameter of posterior ocellus. Eyes less than 0.5 times as long as head. Postocular setae shorter than eyes, with expanded apices. Antennal segments I, II, VII and VIII dark brown; III pale yellow, brownish towards apex; IV to VI dark brown with pale yellow bases; segments III and IV with 3 and 4 sense cones respectively; segment VIII broad at base. Mouthcone rounded.

Thorax brown; pronotum weakly reticulate; major setae developed, with expanded apices. Forefemora dark brown; foretibiae pale yellow, shaded with brown on inner margin near base; foretarsi without tooth; midfemora dark brown basally, pale yellow apically; midtibiae pale yellow; hindfemora pale yellow, shaded with brown on outer margin towards apices. Forewings greyish, with 7 to 8 duplicated cilia; subbasal wing setae S1 and S2 with expanded apices; S3 setae with pointed apex.

Pelta yellow, not developed, hat-shaped; longer than wide, with weak reticulation. Abdominal tergite II yellow. Tergites III, IV and IX brown. Tergite V brown basally, pale apically. Tergites VI to VIII brownish yellow. Tergites II and III each with 2 pairs of sigmoid wing retaining setae. B1 setae of tergite IX shorter than tube, with slightly expanded apices; B2 setae a little shorter than B1, with slightly pointed apices. Tube dark brown, about 0.6 times as long as head. Anal setae developed, about as long as tube.

Male macroptera. Pronotum and forelegs pale yellow. Meso and metanota pale anteriorly and medially. Abdominal tergite II yellow. Tergites III to VIII brownish yellow. Tergite IX brown, with pale anterior margin. Forewings with 5 or 6 duplicated cilia. Foretarsi each with minute tooth.

Material examined. **Paratypes** female, male, PHILIPPINES: near Daet, Bicol National Park, on dead leaves, 12-VIII-1979, S. Okajima (**TMNH**); **Paratypes** female and male, same data (**SMFG**).

Distribution (Fig. 73). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Bicol National Park; Quezon National Park.

Host. dead leaves.

Apelaunothrips flavicornis **Okajima**

Apelaunothrips flavicornis Okajima, 1984: 722-723.
Holotype female, Philippines: Mindanao: Agko, Mt. Apo (**Okajima**)[not examined]

Diagnosis. Body uniformly dark brown. Body setae yellowish. Postocellar setae about as long as diameter of posterior ocelli. Postocular setae slightly shorter than eyes. Antennal segments III and IV with 3 and 4 sense cones respectively. Pronotal major setae well developed, with expanded apices. Forewings with duplicated cilia. Pelta irregularly bell-shaped. Tube shorter than head. This species is known only from the Philippines.

Female macroptera. Head about 1.2 times as long as wide; widest behind eyes; transversely striate. Postocellar setae about as long as diameter of posterior ocelli. Eyes about 0.4 times as long as head. Postocular setae shorter than eyes, with expanded apices. Cheeks weakly rounded; slightly narrowed towards base. Antennal segments I and II dark brown; III yellow; IV to VI yellow tinged with pale brown; segments VII and VIII brown; VIII not strongly constricted basally; segments III and IV with 3 and 4 sense cones respectively. Mouthcone rounded.

Pronotum reticulate; major setae well developed and with expanded apices. Legs brown; femora dark brown; foretarsi without tooth. Forewings with 7 to 8 duplicated cilia; subbasal wing setae S1 and S2 with expanded apices; S3 setae with pointed apices and longest.

Pelta irregularly bell-shaped; weakly reticulate; pair of campaniform sensilla present. B1 setae of tergite IX about as long as tube or slightly shorter, with pointed apices; B2 setae longer than B1. Tube about 0.7 times as long as head. Anal setae shorter than tube.

Male macroptera. Similar to female in general structure and color. Body smaller; abdomen more slender.

Material examined. **Paratype** male, PHILIPPINES: Mindanao: Agko, Mt. Apo, on half dead grass, 31-VII-1979, S. Okajima(**TMNH**); **Paratypes** female and male, same data (**SMFG**); 1 female, 1 male, Baybay, Leyte, on *Musa* sp., 13-V-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 73). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Visayas and Mindanao.

PHILIPPINES: Visayas: VISCA, Baybay, Leyte; Mindanao: Agko, Mt. Apo; Ilomavis [Kidapawan] North Cotabato.

Hosts. half dead grass, grass, dead leaves of evergreen trees, bush with *Bambusa* sp., *Musa* sp.

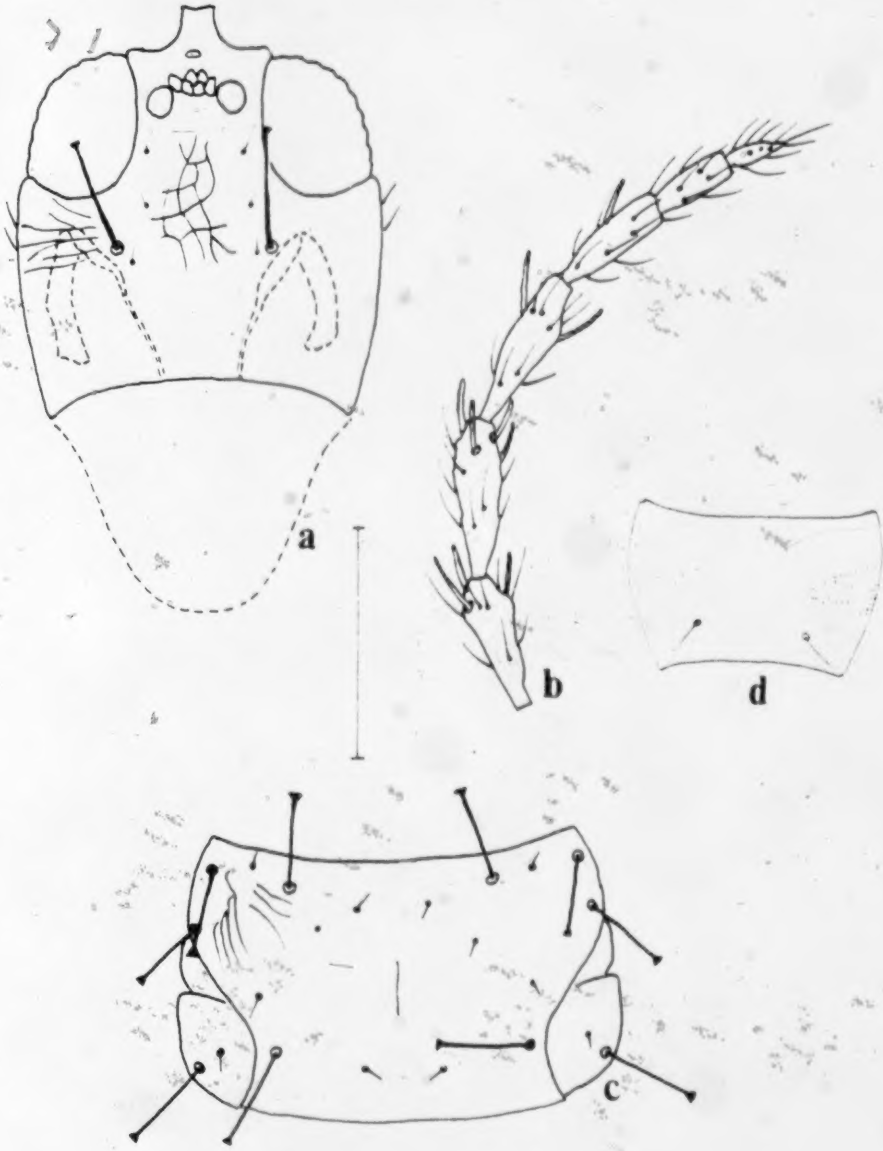
***Apelaunothrips makilingae*, n. sp.**
Holotype female, Philippines: Luzon: Makiling Rainforest, Mt. Makiling (**UPLB**)
Figure 72a, b, c, d

Diagnosis. Body bicolored. Head, pterothorax and abdominal tergites IV and V brown; prothorax, tergites I-III, VI and VII, IX and tube yellow or yellowish white; tergite VIII golden. Body setae expanded apically. Eyes about one-third as long as head. Cheeks slightly incut behind eyes. Antennal segments III and IV with 3 and 4 sense cones respectively. Major pronotal setae well developed, with expanded apices. Fore and midlegs bicolored; hindlegs predominantly yellow. Posterior pair of wing retaining setae on tergites V-VII stout, slightly curved. Tube shorter than head.

Adults of this species are similar to those of *A. fasciatus* in having 4 sense cones on antennal segment IV and antennal segment VIII constricted at base. *A. makilingae*, n. sp. differ from the latter in having smaller eyes; yellowish antennal segments I and II, pronotum, abdominal tergite III and tube, and foretarsi without a tooth in males. This species is known only from the type material.

Female macroptera. Head brown, longer than wide, widest behind eyes; reticulate medially, with transverse anastomosed striae laterally (Fig. 72a). Postocellar setae longer than diameter of posterior ocelli. Eyes about one-third as long as head. Postocular setae well developed; with expanded apices. Cheeks slightly incut behind eyes. Antennal segments slender, more than 2.0 times as long as head; segments I and II yellow, with darker margins; III yellow, with brownish apex; IV and V brown, with yellow bases; VI to VIII brown, VIII constricted at base; segments III and IV with 3 and 4 sense cones respectively (Fig. 72b). Maxillary stylets retracted into head capsule, reaching level of postoculars. Mouthcone rounded (Fig. 72a).

Fig. 72. *Apelaunothrips makilingae*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Male allotype, sternite VIII


a
b
c
d

Pronotum yellowish white; major setae well developed, expanded apically (Fig. 72c). Midlateral and anteroangular setae subequal. Anteromarginal setae longer than anteroangulars; epimeral setae slightly longer than posteroangulars. Fore and midfemora and tibiae bicolored, brown medially and on margins, yellow on apices; all tarsi yellow; hindlegs predominantly yellow. Forewings brownish yellow, slender, with duplicated cilia; subbasal wing setae well developed and with expanded apices. Meso and metanota weakly reticulate.

Pelta weakly developed. Abdominal tergites II, III, VI, VII and IX yellowish white; IV and V brown; VIII light brown. Tergites II to VII each with 2 pairs of wing retaining setae; posterior pair on tergites V to VII stout, slightly curved. B1 setae of tergite IX shorter than tube, expanded apically. Tube yellowish, conical, shorter than head. Anal setae well developed.

Dimensions (holotype female; um). Body length (extended) 1278.4. Head length 166.6, median width 153, dorsal eye length 61.2, postocular setae length 51, antennal segments length: I 25.5, II 37.4, III 57.8, IV 64.6, V 68, VI 52.7, VII 42.5, VIII 30.6. Pronotum length 90.1, median width 187, major setae length: aa 39.1; am 42.5; ml 44.2; pa 42.5; ep 45.9. Tergite IX setae length: B1 56.1; B2 40.8; B3 15.3. Tube length 105.4.

Type data. Holotype female, PHILIPPINES: Luzon: Makiling Rainforest, Mt. Makiling, in litter, 27-VI-1987, C. P. Reyes (**UPLB**). **Paratypes** (4 females, 2 males) same data as holotype (**UPLB**).

Male macroptera. Similar to female in general structure but smaller. Foretarsi each without a tooth. Abdominal tergite V brown on anterior third, yellow on posterior two-thirds. Abdominal sternite VIII with a pair of ?glandular areas (Fig. 72d).

Dimensions (allotype male; um). Body length (extended) 1217.2. Head length 166.6, median width 129.2, dorsal eye length 59.5, postocular setae length

40.8, antennal segments length: I 25.5, II 37.4; III 56.1, IV 64.6; V 66.3; VI 47.6; VII 34, VIII 23.8. Pronotum length 86.7, median width 137.7, major setae length: aa 35.7; am 35.7; ml 34; pa 40.8; ep 40.8. Tergite IX setae length: B1 57.8; B2 22.1; B3 28.9. Tube length 81.6.

Material examined. Type series (**UPLB**).

Etymology. This species is named after Mt. Makiling in reference to the type locality of this thrips.

Distribution. (Fig. 73). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon.

PHILIPPINES: Luzon: Makiling Rainforest, Mt. Makiling.

Host. in litter.

Apelaunothrips marginalis Okajima
Apelaunothrips marginalis Okajima, 1984: 723-724.
Holotype female, Philippines: Mindanao: Ilomavis, [Kidapawan], North Cotabato (**Okajima**)[not examined]

Diagnosis. Body bicolored. Head yellow; pronotum and abdominal tergite IX yellowish brown; meso and metanota yellowish, with brown lateral margins; abdominal tergite II brown, with pale median area; tergites III to VIII yellow to brownish yellow, with brown lateral margins; tube dark brown. Body setae yellow. Postocellar and postocular setae short. Antennal segments III and IV with 3 and 4 sense cones respectively. Forewings light brown, basal fifth pale. Pelta hat-shaped. Tube shorter than head. This species is known only from the Philippines.

Female macroptera. Head yellow, about 1.1 times as long as wide, widest behind eyes,with dark brown lateral margins; reticulate. Postocellar setae a little shorter than posterior ocelli. Postocular setae shorter than eyes and with expanded apices. Cheeks rounded, slightly incut just behind eyes. Antennal segments I and II and VII and VIII brown, VII and VIII lighter than I and II; III yellow; IV to VI brown with pale bases; VIII constricted basally; segments III and IV with 3 and 4 sense cones respectively. Mouthcone rounded.

Pronotum yellowish brown, weakly reticulate; major setae well developed, with expanded apices. Forefemora pale brown; tibiae yellow, sometimes tinged with pale brown; foretarsi without tooth; mid and hindfemora brown, with extreme bases pale. Forewings shaded with light brown; basal fifth clear; duplicated cilia 7 to 8; subbasal wing setae developed, with expanded apices. Meso and metanota yellowish, with brown lateral margins.

Pelta hat-shaped; weakly reticulate. Abdominal tergite II brown, with pale median area. Tergites III to VIII yellow to brownish yellow, with brown lateral margins. Tergite IX yellowish brown; B1 setae short, weakly expanded at apices; B2 setae a little shorter than B1, with expanded apices. Tube about 0.7 times as long as head; brown to dark brown, darkened basally. Anal setae about as long as tube.

Male macroptera. Similar to female in structure but smaller in size. Body color lighter than female. Forefemora brownish yellow. Abdominal tergites III to IX generally yellow to golden.

Material examined. I was not able to borrow Okajima's material.

Distribution (Fig. 73). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Luzon and Mindanao. PHILIPPINES; Luzon: Bicol National Park ; Mindanao: Ilomavis, [Kidapawan], North Cotabato.

Hosts. dead leaves or branches.

Apelaunothrips medioflavus (Karny)
Ophidothrips medioflavus Karny, 1925a: 50, 53
Holotype female, Indonesia: Bindjej Estate, Sumatra (**SMFG**)[examined]
Apelaunothrips medioflavus (Karny); Okajima, 1979a: 56.

Diagnosis. Body bicolored. Head, abdominal tergites VII to IX and tube brown; thorax and abdominal tergites I to VI yellow. Body setae yellow to yellowish brown. Postocular setae about as long as eyes, with expanded apices. Antennal segments III and IV with 2 and 3 sense cones respectively. Legs yellow. Forewings light brown, with duplicated cilia. Pelta triangular, weakly reticulate. Tube shorter than head. The present interpretation of this species follows that of Okajima (1979).

Female macroptera. Head brown, about 1.5 times as long as wide, widest across middle; weakly reticulate. Postocellar setae well developed, with pointed apices. Postocular setae about as long as eyes, with expanded apices; inner pair reduced. Cheeks subparallel, or weakly rounded; slightly constricted behind eyes; base with row of minute setae. Antennae slender; segments I and II brown; III to VI yellow; VII and VIII brownish yellow; segment III and IV with 2 and 3 sense cones respectively. Mouthcone rounded.

Pronotum yellow, about 0.5 times as long as head; weakly sculptured; major setae with expanded apices. Legs yellow; foretarsi without a tooth. Forewings shaded with light brown; duplicated cilia 8 to 9; subbasal wing setae with expanded apices.

Pelta triangular, weakly reticulate, with pair of campaniform sensilla. Abdominal tergites slender; major setae well developed, with expanded apices. Tergites I to VI yellow; VII to X brown to dark brown. B1 setae of tergite IX weakly expanded or nearly pointed apically; B2 setae with expanded apices, longer than B1. Tube brown, shorter than head; about 1.7 times as long as basal width. Anal setae longer than tube.

Male macroptera. Color and general structure similar to female but body smaller. Not known in the Philippines.

Material examined. Material reported from the Philippines was not examined.

Distribution (Fig. 73). The known range of this species extends from Taiwan to the Indonesia Archipelago. In the Philippine Archipelago, this species is known from the island of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo. INDONESIA: Sumatra; Java. TAIWAN.

Hosts. dead leaves of evergreen tree, *Nicotiana tabacum*, dead branches, dead fern

Apelaunothrips philippinensis **Okajima**
Apelaunothrips philippinensis Okajima, 1984: 724-725
Holotype female, Philippines: Luzon: Bicol National Park (**Okajima**)[not examined]

Diagnosis. Body uniformly dark brown. Body setae yellow. Head widest behind eyes. Postocular setae much shorter than length of eyes. Antennal segments III and IV with 3 and 4 sense cones respectively. Forewings light brown, with duplicated cilia. Pelta irregularly bell-shaped, with median reticulation. Tube shorter than head. This species is known only from the Philippines.

Female macroptera. Head slightly longer than wide, widest behind eyes, with transverse striae. Postocellar setae about as long as diameter of posterior ocelli or longer. Eyes about 0.45 times as long as head. Postocular setae much shorter than eyes, with expanded apices. Cheeks weakly rounded, slightly constricted towards base. Antennal segments I, II, VII and VIII dark brown; III generally yellow and brownish subapically; bases of IV to VI pale; VIII broad at base; segments III and IV with 3 and 4 sense cones respectively. Mouthcone rounded.

Pronotum sculptured posteriorly; major setae developed,with expanded apices. Forefemora slender; foretarsi without tooth; mid and hindtibiae brown with paler apices. Forewings light brown; duplicated cilia 6 to 7; subbasal wing setae developed; S1 and S2 setae with expanded apices; S3 setae with pointed apices, longest.

Pelta irregularly bell-shaped; reticulate medially. B1 setae of tergite IX shorter than tube, pointed apically; B2 setae with pointed apices, longer than B1. Tube about 0.7 times as long as head. Anal setae about as long as tube.

Male macroptera. Similar to female in color except legs paler; forefemora enlarged in large males, each with stout tooth and row of small teeth; foretarsi with short, wide-based expansion. In small males, forefemora and tarsi without tooth. Forewings with 4 or 5 duplicated cilia.

Material examined. 1 female, Quezon National Forest Park near Lucena City, on dead leaves, 22-VIII-1979, S. Okajima (**TMNH**).

Distribution (Fig. 73). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Bicol National Park; Quezon National Forest Park.

Host. dead leaves.

Apelaunothrips rostratus Okajima

Apelaunothrips rostratus Okajima, 1984:727-728.
Holotype male, Philippines: Luzon: Agko, Mt. Apo (**Okajima**)[not examined]

Diagnosis. Body bicolored. Head, thorax, abdominal tergites III to IX yellow; tergite II yellow, with brown anterior angles; tube dark brown, with pale bases. Body setae yellow. Postocular setae about as long as eyes or slightly longer. Antennal segments III and IV with 3 and 4 sense cones respectively. Legs yellow. Forewings light brown, with duplicated cilia. Pelta weakly developed, hat-shaped. Tube shorter than head. The present interpretation of this species follows that of Okajima (1984). *A. rostratus* is known only from the type material.

Male macroptera. Head yellow, about 1.25 times as long as wide, widest behind eyes; reticulate. Postocellar setae shorter than diameter of posterior ocelli. Eyes about 0.4 times as long as head. Postocular setae about as long as eyes or slightly longer, with expanded apices. Cheeks dark brown, weakly rounded. Antennal segments I, II, apices of IV to VI, VII, and VIII brown to dark brown; III and bases of IV to VI pale; VIII constricted basally; segments III and IV with 3 and 4 sense cones respectively. Mouthcone elongate, rounded.

Pronotum yellow, weakly sculptured; major setae expanded apically. Legs yellow to brownish yellow; forefemora slender; foretarsi without tooth. Forewings shaded with light brown, with 7 to 8 duplicated cilia; subbasal wing setae developed and all with expanded apices.

Pelta hat-shaped, very weakly developed. Abdominal tergite II yellow, with brown anterior angles; tergites III to IX yellow. B1 setae of tergite IX much shorter than tube, with expanded apices; B2 setae shorter than B1, weakly expanded apically. Tube dark brown, with extreme base pale ; about 0.7 times as long as head. Anal setae little longer than tube.

Male macroptera. Similar to female in general color and structure. Body smaller. Foretarsi each with minute tooth.

Material examined. I was not able to borrow Okajima's specimens.

Distribution (Fig. 73). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo.

Host. dead leaves.

Apelaunothrips simpliceps Okajima
Apelaunothrips simpliceps Okajima, 1984: 727-728.
Holotype female, Philippines: Mindanao: Agko, Mt. Apo (**Okajima**)[not examined]

Diagnosis. Body dark brown. Body setae yellowish. Head slightly longer than wide. Postocular setae shorter than eyes, with expanded apices. Antennal segments III and IV with 3 and 4 sense cones respectively. Pronotal major setae well developed, with expanded apices. Forewings light brown, with duplicated cilia. Pelta irregularly bell-shaped. Tube shorter than head. The present interpretation of this species follows that of Okajima (1984). *A. simpliceps* is known only from the type material.

Female macroptera. Head about 1.1 times as long as wide, widest behind eyes; sculptured laterally and posteriorly. Postocellar setae about as long as width of posterior ocelli. Postocular setae shorter than eyes, with expanded apices. Cheeks slightly rounded, gradually narrowed towards base. Antennal segments I and II dark brown; III brownish yellow; IV to VI brown with yellow bases; VII and VIII brown; VIII constricted at base; segments III and IV with 3 and 4 sense cones respectively. Mouthcone rounded.

Pronotum weakly sculptured; major setae well developed, with expanded apices; epimeral setae longer than posteroangulars. Femora dark brown, slender; tarsi yellow without tooth. Forewings shaded with pale brown; duplicated cilia 7 to 8; subbasal wing setae developed, with expanded apices.

Pelta irregularly bell-shaped; weakly reticulate. B1 of tergite IX much shorter than tube, with pointed apices; B2 setae shorter than B1, with pointed apices. Tube about 0.7 times as long as head. Anal setae about as long as tube.

Male. Unknown.

Material examined. I was not able to borrow Okajima's specimen.

Distribution (Fig. 73). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo.

Host. dead leaves of evergreen tree

***Apelaunothrips sp.* 1**
Apelaunothrips sp. 1 Okajima, 1984: 728.

Diagnosis. Head about 1.15 to 1.125 times as long as wide, with closely spaced transverse striae. Mid and hindtibiae dark brown with paler apices. Pelta with pair of campaniform sensilla. I was not able to borrow Okajima's specimens. The above notes follows Okajima's original description of this species.

Distribution (Fig. 73). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: Quezon National Forest Park; Bicol National Park; Mindanao: Ilomavis [Kidapawan], North Cotabato; Agko, Mt. Apo.

Hosts. dead leaves, dead twigs, fern.

Apelaunothrips sp. 2

Apelaunothrips sp. 2 Okajima, 1984: 728.

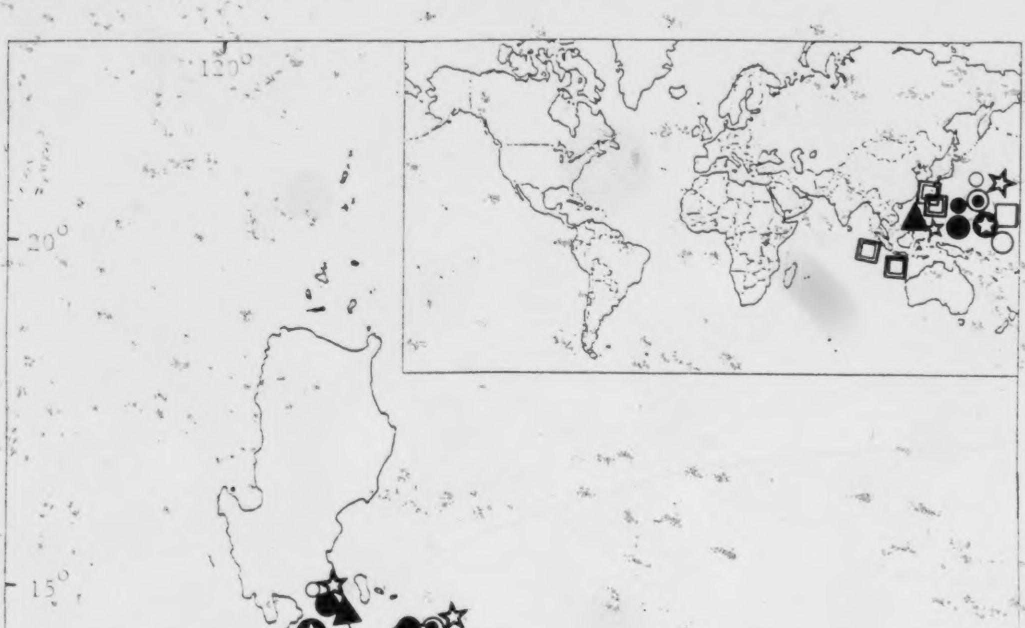
Diagnosis. Head about 1.1 to 1.15 times as long as wide, with widely spaced transverse striae; hexagonally reticulate between eyes. Mid and hindtibiae yellow, sometimes shaded with brown. Pelta with pair of campaniform sensilla. According to Okajima (1984), this species is very near to *A. consimilis* from Taiwan and Japan. I was not able to borrow Okajima's specimens. The above notes follows Okajima's original description of this species.

Distribution (Fig. 73). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: Quezon National Forest Park; Bicol National Park; Mindanao: Ilomavis [Kidapawan], North Cotabato; Agko, Mt. Apo.

Hosts. dead leaves, dead branches.

Fig. 73. Distribution of *Apelaunothrips* species in the Philippines, and world.

☆ *A. cephalicus* Hood
● *A. fasciatus* Okajima
• *A. flavicornis* Okajima
✪ *A. makilingae*, n. sp.
◉ *A. marginalis* Okajima
▣ *A. medioflavus* Karny
▲ *A. philippinensis* Okajima
○ *A. rostratus* Okajima
□ *A. simpliceps* Okajima
☆ *Apelaunothrips* sp. 1
◦ *Apelaunothrips* sp. 2



120°
20°
15°
10°
125°

Genus *Bradythrips* Hood and Williams

Bradythrips Hood and Williams, 1925: 68.
Type species: *Bradythrips hesperus*, by original designation.

Diagnosis. Head longer than wide, swollen dorsally, gradually widened or slightly constricted towards base, tuberculate. Vertex produced in front of eyes, with pair of stout setae, knobbed or expanded apically. Eyes small, with enlarged posterior ommatidia, eye facets separated from each other. Ocelli present or absent. Cheeks with or without stout setae on tubercles. Antennae 6 or 7-segmented, segments III-V longer than wide. Maxillary stylets retracted into head capsule almost to level of eyes and wide apart.

Pronotum weakly tuberculate; wider than long, with major setae well developed; probasisternum fused medially; praepectal plates present. Macropterous or apterous

Abdomen reticulate, tergites II-VII each with a pair of lanceolate or fin-shaped wing retaining setae. Tube slender, longer than head, with setae. Anal setae longer than tube.

Adults of *Bradythrips* species have their antennae and head resembling those of *Stephanothrips* Trybom in structure. Both apterous and macropterous individuals are known in this genus. Two species are included (Okajima, 1982) of which only *B. philippinensis* is known from the Philippines.

Bradythrips philippinensis Okajima
Bradythrips philippinensis Okajima, 1982: 51-56.
Holotype female, Philippines: Luzon: Bicol National Park (**Okajima**)[not examined]

Diagnosis. Body brown to dark brown. Body setae yellow to brownish yellow. Head longer than wide, widest at base; surface tuberculate. Eyes with anterior ommatidia directed forwards; posterior ommatidia enlarged. Cheeks with 4 pairs of stout setae, each on well developed tubercle. Antennal segments III and IV with 1 and 2 slender sense cones respectively. Pronotal major setae well developed, with blunt apices. Legs generally brown. Forewings light grey, with brown, median, longitudinal stripe. Abdominal tergites II to VII each with pair of fin-like wing retaining setae. Tube longer than head. The present interpretation of the species follows that of Okajima (1982).

Female macroptera. Head about 1.3 times as long as wide or longer; swollen dorsally; gradually widened towards and widest at base, tuberculate. Vertex produced in front of eyes and bearing pair of well developed setae with knobbed or expanded apices. Eyes less than one-third the length of head; anterior ommatidia directed forward; posterior ommatidia well developed. Cheeks with 4 pairs of stout setae each borne on well developed tubercle. Antennal segments brownish except segment III yellowish, sometimes segment II with pale apex; segments IV, V, and VI subequal; segment VII longest; segments III, IV, and V with 1, 2, and 1 long, slender sense cones respectively.

Pronotum weakly tuberculate anteriorly and posteriorly; anteromarginal setae 3 pairs, blunt at apex; posteromarginal setae mesad epimerals, 4 pairs, blunt at apex. Femora brown to dark brown, with extreme apices pale; tibiae brown with pale bases and apices; tarsi brown. Forewings shaded with pale grey, each with brown, median, longitudinal stripe. Metanotum tuberculate, with 11 to 14 pairs of setae, having blunt apices.

Abdominal tergites II to VII each with pair of fin-like wing retaining setae. Tube about 1.6 times as long as head; yellowish brown; base and apex darker. Anal setae reduced except 1 pair well developed, about 3 times as long as tube.

Male macroptera. Similar to female in body color but antennal segment II lighter. Middorsal head setae well developed. Eyes with only 6 large ommatidia. Ocelli absent. Pronotum with well developed anteromarginal and posteromarginal setae.

Material examined. I was not able to borrow Okajima's specimens.

Distribution (Fig. 74). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: Bicol National Park; Mindanao: Agko, Mt. Apo.

Hosts. dead leaves, dead leaves of Palmae

Genus *Dexiothrips* Hartwig

Dexiothrips Hartwig, 1952: 452-453.
Type species: *Dexiothrips pensus* Hartwig, by original designation and monotypy.

Diagnosis. Head 1.4 to 1.6 times as long as wide, slightly widened from behind eyes to base; vertex produced in front of eyes; eyes small and bulging; postocular setae long. Cheeks bulged on basal third of head, with setae minute. Antennae 8-segmented; segments IV-VIII each with constricted base, sense cones moderately long and slender.

Pronotum small, about 0.55 times as long as head; major setae developed with expanded apices; anteromarginal setae longer than anteroangulars, posteromarginal setae longer than epimerals. Foretarsi each without tooth in both sexes. Macropterous or brachypterous. Forewings gradually narrowed towards middle, slightly narrower apically, with duplicated cilia.

Abdomen moderately long; major tergal setae with expanded apices. Tergites II-VII each with 2 pairs of wing retaining setae. Tube setae longer than tube. Antecostal ridges of tergites VIII-IX heavily sclerotized. Anal setae pointed.

Macropterous and brachypterous adults of *Dexiothrips* differ in body color but both have their major body setae uniformly expanded at their apices . Priesner (1961) related *Dexiothrips* to *Apelaunothrips* Karny species and Okajima (1979) distinguished members of the former from those of *Apelaunothrips* based on: head slightly widened from behind eyes to base; maxillary stylets form V within head; maxillary bridge present; pronotal anteroangular and midlateral setae not close together; and posterior pair of wing retaining setae on abdominal tergite II straight. Three species are included in *Dexiothrips* (Jacot-Guillarmod, 1978; Okajima, 1979a) of which only *D. madrasensis* is known from the Philippines.

Dexiothrips madrasensis **(Ananthakrishnan)**
Malacothrips madrasensis Ananthakrishnan, 1964: 109-110.
Holotype unknown, India: Madras (**Ananthakrishnan**) [not examined]
Dexiothrips madrasensis (Ananthakrishnan); Okajima, 1984: 729.

Diagnosis. Body bicolored. Head, pro and mesonota, abdominal tergites II to IV, VI to IX and tube brown; metanotum and tergites I and V yellow. Head longer than wide. Eyes protruding. Antennal segments III and IV with 2 and 3 sense cones respectively. Pronotal midlateral setae not placed close to anteroangulars. Legs yellow. Forewings with duplicated cilia. Pelta triangular. Tube shorter than head. The present interpretation of this species follows that of Okajima (1984).

Female macroptera. Head brown, about 1.3 times as long as wide; distinctly constricted behind eyes. Eyes protruded. Cheeks rounded, slightly widened towards base. Antennal segments I and II dark brown; III to IV brownish yellow; V to VIII brown, V pale basally; VIII distinctly constricted basally; segments III and IV with 2 and 3 sense cones respectively. Mouthcone rounded.

Pronotum brown; major setae developed, with expanded or knobbed apices; anteroangular and midlateral setae not placed close together. Legs yellow. Forewings with 8 to 10 duplicated cilia. Mesonotum brown; metanotum yellow.

Pelta triangular. Abdominal tergites II to IV, VI to IX and tube brown; tergites I and V yellow. Tergites II to VII each with 2 pairs of wing retaining setae; posterior pair on tergite II straight. B1 setae on tergite IX long. Tube shorter than head. Anal setae longer than tube.

Male macroptera. Similar to female in structure. Abdominal tergite VI yellow unlike those of males from India, Malaysia, and Indonesia which is brown.

Material examined. Type material not examined.

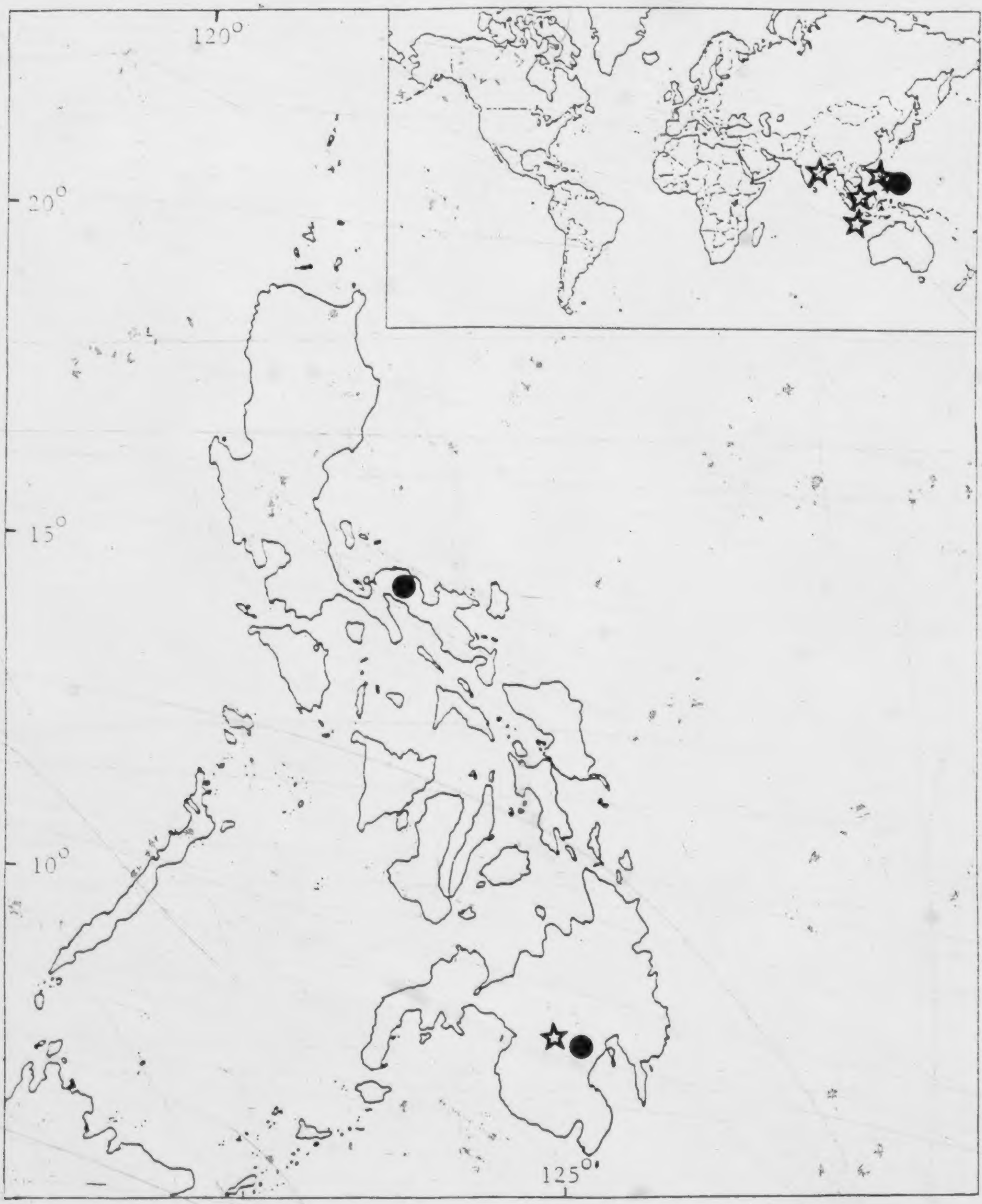
Distribution (Fig. 74). The known range of this species extends from India eastward in Malaysia, to the Indonesian Archipelago. In the Philippine Archipelago, this species is known from the island of Mindanao. PHILIPPINES: Mindanao: Ilomavis, [Kidapawan], North Cotabato. MALAYSIA: Kuala Lumpur. INDONESIA: Java. INDIA.

Hosts. dead twigs, decaying twigs, *Axonopus* sp., grass

Fig. 74. Distribution of *Bradythrips philippinensis* Okajima and *Dexiothrips madrasensis* (Ananthakrishnan) in the Philippines, and world.

● *Bradythrips philippinensis* Okajima

☆ *Dexiothrips madrasensis* (Ananthakrishnan)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Genus *Dolichothrips* Karny

Dolichothrips Karny, 1912b: 299.
Type species: *Dolichothrips longicollis* Karny, by original designation and monotypy.

Diagnosis. Head longer than wide, reticulate, slightly constricted towards base; eyes prolonged ventrally; ocellar setae minute; postocular setae developed; cheek setae fine. Antennae 8-segmented, segment III with 2 or 3 sense cones. Maxillary stylets retracted into head; maxillary bridge present. Mouthcone long and pointed.

Pronotum with developed major setae; epimeral sutures complete. Praepectal plates present, closed to mouthcone. Probasisternum divided, almost joined medially. Mesopraesternum divided into 2 sclerites. Foretarsi each with small tooth. Forewings constricted medially, with duplicated cilia.

Pelta broadly triangular. Abdominal tergites II-VII each with 2 pairs of wing retaining setae. Tergal lateral setae well developed, pale, or shaded. Tube conical.

Dolichothrips include about 20 species from the old world tropics (Mound and Houston, 1987). Members of this genus are easily distinguished by their long, slightly constricted head and very long and pointed mouthcone. Six species are known from the Philippines.

Key to Philippine species of *Dolichothrips* Karny

1 Antennal segment IV with 4 sense cones (Fig. 75b); postocular setae expanded apically .... *D. crassusensus*, n. sp.

1' Antennal segment IV with 2 sense cones; postocular setae rounded apically 2

2(1) Pronotum with major setae long, expanded apically; mid and hindtibiae brown or pale at apex 3

2' Pronotum with major setae long, rounded apically; mid and hindtibiae brown or yellow 4

3(2) Antennal segment IV longer than segment V; pronotal setae well developed .... *D. assimilis* Priesner

3' Antennal segment IV subequal to segment V; pronotal setae short .... *D. pumilus* Priesner

4(2') Foretarsi each with a moderately large tooth; mid and hindtibiae brown with pale apices .... *D. longicollis* Karny

4' Foretarsi each with a small tooth; mid and hindtibiae yellow 5

5(4') Head 2.0 to 2.5 times as long as wide; antennal segment VIII yellow; femora brown .... *D. macarangai* Moulton

5' Head about 1.7 times as long as wide; antennal segment VIII greyish brown; femora golden .... *D. flavipes* (Moulton)

Dolichothrips assimilis **Priesner and Seshadri**
Dolichothrips assimilis Priesner and Seshadri 1952: 405-406.
Syntype female India: Valparai, South India (**SMFG**) [examined]

Diagnosis. Body brown. Body setae yellowish brown. Head longer than wide, slightly constricted at base. Eyes prolonged ventrally. Postocular setae longer than dorsal length of eyes, with blunt apices. Antennal segments III to VII yellow. Pronotal major setae well developed, with expanded apices. Legs bicolored. Forewings pale, with duplicated cilia. Pelta triangular. Tube pale at apex, shorter than head. This is the first record of *D. assimilis* in the Philippines.

Female macroptera. Head less than 2 times as long as wide; slightly constricted at base; transversely striate. Ocellar hump small. Eyes about one-third of head length, prolonged ventrally. Postocular setae longer than dorsal length of eyes, with knobbed apices. Antennal segments I and II brown, II pale at apex; III to VII yellow; VIII greyish brown; III about as long as segment IV; segment V shorter than IV. Mouthcone elongate, pointed, reaching about two-thirds the length of prosternum.

Pronotal major setae developed, with expanded apices; anteroangular and anteromarginal setae about as long as midlaterals; posteroangular setae about as long as epimerals. Femora brown; forefemora slightly enlarged; foretibiae yellow, with brown base; foretarsi each with very small tooth; mid and hindtibiae brown with pale bases; all tarsi yellow. Forewings pale, with 10 duplicated cilia; subbasal wing setae well developed and with expanded apices. Metanotum with weak longitudinal reticulation.

Pelta triangular, reticulate; pair of campaniform sensilla present. Abdominal tergites II to VII with 2 pairs of wing retaining setae; laterodorsal setae well developed. B1 setae of tergite IX longer than tube, pointed at apex. Tube pale at apex; shorter than head. Anal setae well developed.

Male macroptera. Similar to female in general structure and color but body more slender. Foretarsal tooth stronger. Not yet known in the Philippines.

Material examined. 4 females, NRCP, Bicutan, Taguig, Rizal, on unknown tree, 7-VII-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 76). The known range of this species extends from India to the Philippine Archipelago. In the Philippines, this species is known from the island of Luzon. PHILIPPINES: Luzon: NRCP, Bicutan, Taguig, Rizal. INDIA.

Hosts. unknown tree, flowers of *Macaranga indica*

***Dolichothrips crassusensus*, n. sp.**
Holotype female, Philippines: Luzon: Mt. Mayon, Albay (**UPLB**)
Figure 75a, b, c, d

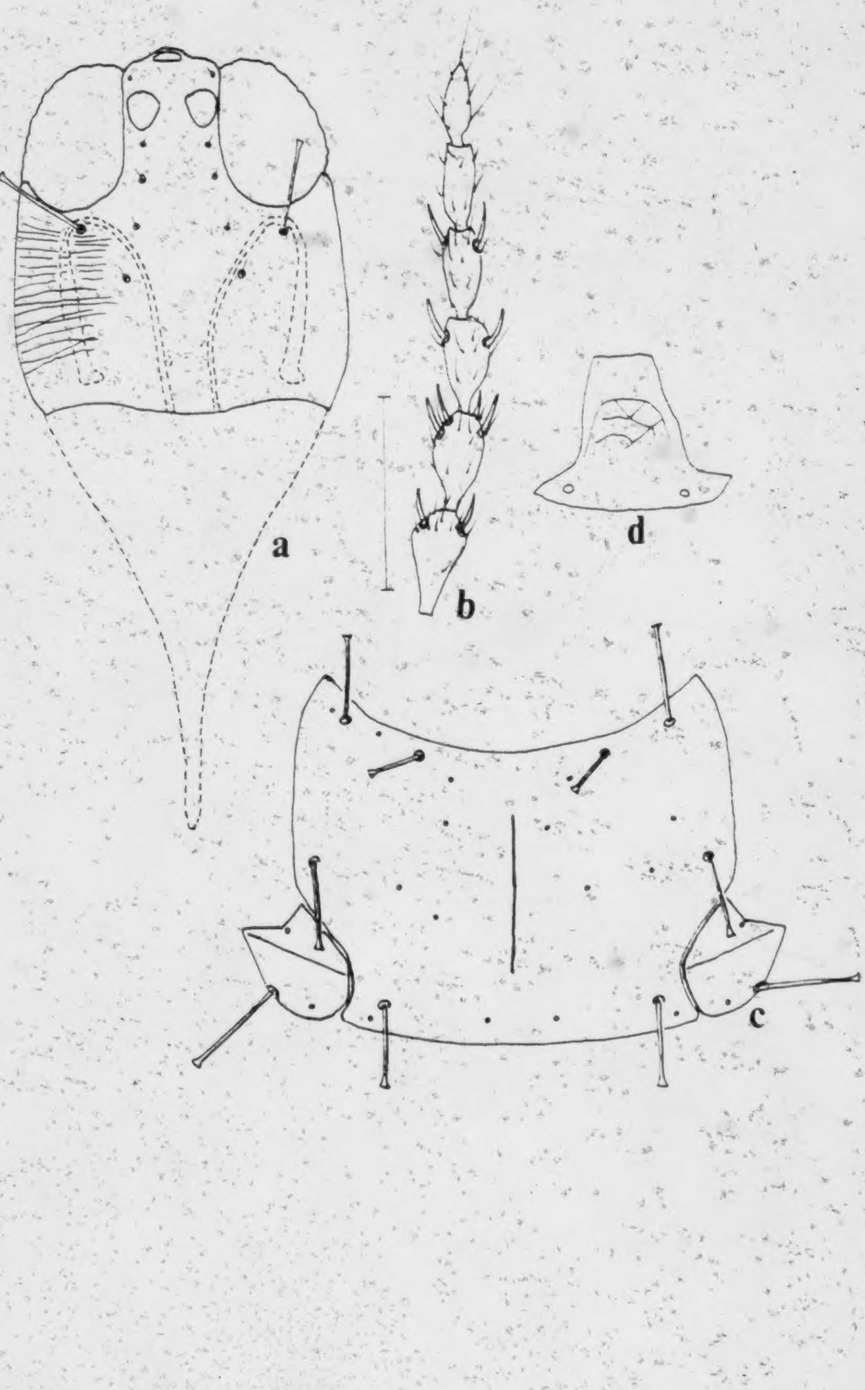
Diagnosis. Body bicolored. Body setae pale. Head transversely striate, widest near base. Postocular setae with expanded apices. Antennal segment III yellow; segments III and IV with 2 and 4 moderately stout sense cones respectively. Mouthcone very long and narrow and extended posterior margin of prosternum. Major setae of pronotum with expanded apices. Praepectal plates present. Forefemora enlarged. Forewings yellow with duplicated cilia. Metascutum with longitudinal reticulation. Tube shorter than head, yellowish at base and on apical third.

This species is temporarily placed under *Dolichothrips* for its adults possess praepectal plates, a maxillary bridge, and a long mouthcone typical of members of *Dolichothrips*. Adults of *D. crassusensus*, n. sp. are similar to those of *Hoplandrothrips* in having 4 stout sense cones on antennal segment IV and a bicolored body. This species is known only from the type material.

Female macroptera. Head longer than wide, widest near base; transversely striate (Fig. 75a). Ocelli large. Eyes more than one-third as long as head. Postocular setae shorter than eyes, with expanded apices. Cheeks smooth. Antennal segments I and II brown; II with pale apex; III yellowish; IV to VIII brown; segments III and IV with 2 and 4 moderately stout sense cones respectively; segment VII constricted at base (Fig. 75b). Maxillary bridge present (Fig. 75a). Mouthcone very long, extended posterior margin of prosternum (Fig. 75a).

Pronotum brown; major setae well developed, with expanded apices; anteroangular setae longer than anteromarginal and midlateral setae; epimeral setae longer than posteroangulars (Fig. 75c). Praepectal plates present. Forefemora enlarged; brown, with pale apices; foretibiae and tarsi yellow; foretarsi each with pointed tooth; midfemora yellow, shaded with light brown medially; midtibiae and tarsi yellow; hindlegs yellow.

Fig. 75. *Dolichothrips crassusensus*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta


a
b
c
d

Forewings yellowish, with 7 duplicated cilia; subbasal wing setae well developed, with expanded apices. Meso and metanota brown laterally, yellowish brown medially. Metascutum with longitudinal reticulations.

Pelta hat-shaped, reticulate, with a pair of campaniform sensilla (Fig. 75d). Abdomen yellow except tergite IX light brown; tergal lateral well developed, with expanded apices. Tergites II to VII each with 2 pairs of wing retaining setae. B1 setae of tergite IX slender, shorter than tube, pointed at apex. Tube shorter than head; yellowish at base and on apical third. Anal setae well developed.

Dimensions (holotype female, um). Body length (extended) 1849.6. Head length 197.2, median width 170; dorsal eye length 71.4; postocular setae length: 57.8; antennal segments length: I 39.1; II 46.8; III 57.8; IV 57.8; V 49.3; VI 45.1; VII 42.5; VIII 39.1. Pronotum length 151.3, median width 227.8, major setae length: aa 47.6, am 40.8, ml 44.2, pa 49.3, ep 59.5. Tergite IX B setae length: B1 107.9, B2 115.6, B3 117.3. Tube length: 132.6.

Type data. **Holotype** female, PHILIPPINES: Luzon: Mt. Mayon, Albay near rest house, on tree fern, 6-VI-1987, C. P. Reyes (**UPLB**).

Male. Unknown

Material examined. **Holotype** only (**UPLB**).

Etymology. Crassusensus is taken from two Latin words crassus and sensus meaning "thick sense" in reference to the stout sense cones of this thrips.

Distribution (Fig. 76). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Mt. Mayon, Albay.

Host. tree fern

***Dolichothrips flavipes* (Moulton)**
Neoheegeria flavipes Moulton, 1928a: 317-318.
Holotype female, Taiwan: Taihoku (CASC)[examined]

Diagnosis. Body brown. Body setae yellowish brown. Head longer than wide. Eyes prolonged ventrally. Postocular setae well developed, longer than dorsal length of eyes, with blunt or pointed apices. Antennal segments III to VII yellow. Pronotal major setae well developed, rounded or slightly expanded at apex. Foretarsi each with small tooth. Forewings pale, with duplicated cilia. Pelta triangular. Tube with pale base and apex, shorter than head. This is the first record of *D. flavipes* in the Philippines.

Female macroptera. Head longer than wide, with transverse striae. Ocellar hump small. Eyes about 0.30 times as long as head; prolonged ventrally. Postocular setae well developed, longer than dorsal length of eyes, with blunt to pointed apices. Cheeks nearly parallel-sided, slightly constricted at base. Antennae about 1.36 times as long as head; segment I brown; II brownish yellow with pale apex; III to VII yellow; VIII greyish brown and constricted at base. Mouthcone pointed and extended to posterior margin of prosternum.

Pronotum faintly reticulate to nearly smooth; major setae developed, rounded or slightly expanded at apices; midlateral setae about as long as anteroangulars; epimeral and posteroangular setae well developed, subequal. Forefemora slightly enlarged; all femora yellowish brown; tibiae and tarsi yellow; foretarsi each with very small tooth. Forewings pale, with 4 to 6 duplicated cilia; subbasal wing setae developed, with slightly expanded apices; setae S3 longest, about 2 times as long as S1. Metanotum longitudinally reticulate.

Pelta triangular, reticulate; pair of campaniform sensilla present. Abdomen slender. Tergites II to VII each with 2 pairs of wing retaining setae. Laterodorsal setae developed. B1 setae of tergite IX with pointed apices, about as long as tube. Tube about 0.7 times as long as head; brown, with pale base and apex. Anal setae short.

Male macroptera. Similar to female in general color and structure. Body more slender. Foretarsal tooth stronger.

Material examined. 1 female, Sipit Saburan, Puerto Gallera, Oriental Mindoro, on unknown flower, 19-VI-1987, C. P. Reyes; 2 females, on *Citrus* sp., 19-VI-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 76). The known range of this species extends from Taiwan to the Philippine Archipelago. In the Philippines, this species is known from the island of Visayas. PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro. TAIWAN.

Hosts. unknown flower, *Citrus* sp., Euphorbia sp.

Dolichothrips longicollis **Karny**
Dolichothrips longicollis Karny, 1912a: 299-301.
Syntypes male, female, Indonesia: Java, Semarang (**SMFG**)[examined]

Diagnosis. Body brown. Body setae dark. Head longer than wide, slightly constricted at base. Eyes more than one-third of head length, prolonged ventrally. Postocular setae longer than dorsal length of eyes, with blunt apices. Antennal segments III to VIII yellow. Pronotal major setae developed, with expanded apices. Foretarsi each with moderately large tooth. Forewings pale, with duplicated cilia. Pelta irregularly triangular. Tube shorter than head, pale at apex. This is the first record of *D. longicollis* in the Philippines.

Female macroptera. Head longer than wide; slightly constricted at base, with transverse striae. Ocellar hump small. Eyes more than one-third of head length, slightly prolonged ventrally. Postocular setae developed, longer than dorsal length of eyes, with blunt apices. Antennal segment I brown; II yellow, with extreme base and inner margin brownish; III to VIII yellow; VII constricted at base. Mouthcone pointed, reaching anterior half of prosternum.

Pronotum transversely striate; major setae developed, with expanded apices; anteromarginal setae about as long as midlaterals and longer than anteroangulars; epimeral setae about as long as posteroangulars. Femora brown; forefemora enlarged; foretibiae brownish in basal third; mid and hindtibiae brown with pale apices; foretarsi each with moderately large tooth; tarsi yellow. Forewings pale, with 10 duplicated cilia; subbasal wing setae brownish, well developed, with expanded apices. Metanotum longitudinally reticulate.

Pelta irregularly triangular, reticulate; pair of campaniform sensilla present. Abdominal tergites faintly reticulate. Tergites II to VII each with 2 pairs of wing retaining setae. Laterodorsal setae well developed, dark, with slightly expanded apices. B1 setae of tergite IX with pointed apices; longer than tube. Tube shorter than head; conical; brown, pale at apex. Anal setae short.

Male macroptera. Similar to female in general color and structure but head longer and body more slender. Postocular setae shorter than dorsal length of eyes.

Material examined. 20 females, Sagpangan, Palawan, on leaf sheath of unknown plant, 24-V-1987, V. Fernando; 8 females. 1 male, PNAC, Aborlan, Palawan, on *Macaranga* sp., 27-I-1985, C. P. Reyes (**CPRC**).

Distribution (Fig. 76). The known range of this species extends from the Philippines to the Indonesian Archipelago. In the Philippine Archipelago, this species is known from the island of Palawan. PHILIPPINES: Palawan: Sagpangan; PNAC, Aborlan. INDONESIA: Java.

Hosts. leaf sheath of unknown plant, *Macaranga* sp., male flowers of and galls on *Macaranga tanarius*

Dolichothrips macarangai Moulton
Neoheegeria macarangai Moulton, 1928a: 319-321.
Holotype female, Taiwan: Taihoku (**CASC**) [examined]

Diagnosis. Body dark brown. Body setae dark. Head much longer than wide. Eyes prolonged ventrally. Postocular setae slightly shorter than dorsal length of eyes, with blunt apices. Antennal segments III to VIII yellow. Pronotum smooth medially. Foretarsi each with small tooth. Forewings pale, with duplicated cilia; subbasal wing setae dark, with blunt apices. Pelta triangular. Tube shorter than head, with pale apex. This is the first record of *D. macarangai* in the Philippines.

Female macroptera. Head longer than wide; transversely striate. Ocellar hump small. Eyes about one-third of head length, prolonged ventrally. Postocular setae slightly shorter than dorsal length of eyes, with blunt apices. Cheeks nearly parallel-sided, slightly constricted at base. Antennae about 1.33 times as long as head; I and II brown, II with pale apex; III to VIII yellow; VIII greyish at apex, constricted at base. Mouthcone long, pointed, extended posterior margin of prosternum.

Pronotum smooth medially; transversely striate laterally, anteriorly and posteriorly; major setae developed, with blunt apices; anteroangular setae about as long as anteromarginals, longer than midlaterals; epimeral setae about as long as posteroangulars. Femora brown; tibiae and tarsi yellow; forefemora slightly enlarged; foretarsi each with very small tooth. Forewings pale, with 6 to 9 duplicated cilia; subbasal wing setae dark; well developed, with blunt apices. Metanotum longitudinally reticulate.

Pelta triangular, reticulate; pair of campaniform sensilla present. Abdomen slender; tergites faintly reticulate. Tergites II to VII each with 2 pairs of wing retaining setae. Laterodorsal setae of tergites well developed, dark. B1 setae of tergite IX longer than tube, with pointed apices. Tube about 0.57 times as long as head; conical, with pale apex. Anal setae developed.

Male macroptera. Similar to female in color. Forefemora enlarged. Foretarsal tooth well developed. Pronotal setae shorter. Abdomen more slender.

Material examined. 1 female, Bicol Expt.. Station, Pili, Camarines Sur, on *Macaranga* sp., 5-VI-1987, C. P. Reyes; 4 females, Anuling, Pamocotan, Zamboanga, on *Macaranga* sp., 11-VII-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 76). The known range of this species extends from Taiwan to the Philippine Archipelago. In the Philippines, this species is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: Bicol Expt.. Sta., Pili, Camarines Sur; Mindanao: Anuling, Pamocotan, Zamboanga. TAIWAN.

Hosts. *Macaranga* sp., *Macaranga tanarius*

Dolichothrips pumilus **Priesner**
Dolichothrips pumilus Priesner, 1935: 362-364.
Syntype male Taiwan: Nisui (**SMFG**) [examined]

Diagnosis. Body brown. Body setae pale. Head much longer than wide, slightly constricted at base. Eyes about one-third as long as head, prolonged ventrally. Postocular setae shorter or about as long as dorsal length of eyes, with blunt apices. Antennal segments III to VII yellow. Pronotal major setae well developed, with expanded apices. Foretarsi each with small tooth. Forewings pale, with duplicated cilia. Pelta irregularly triangular. Tube shorter than head, with pale apex.

This is the first record of *D. pumilus* in the Philippines. According to Priesner (1935), this species is very similar to *D. indicus* Hood [not known in the Philippines] except for the length of antennal segment IV, color of antennal segment VII, and moderately robust antennae.

Male macroptera. Head less than 2.0 times as long as wide; transversely reticulate; slightly constricted at base. Ocellar hump small. Eyes about one-third as long as head length, slightly prolonged ventrally. Postocular setae shorter than or about as long as dorsal length of eyes, with blunt apices. Antennal segments I and II brown, II pale apically; III to VII yellow; VIII greyish brown. Mouthcone pointed, extended anterior half of prosternum.

Pronotal major setae rather short, with expanded apices; anteromarginal setae slightly longer than anteroangulars; epimeral setae about as long as posteroangulars. Femora brown; forefemora enlarged; foretibiae yellowish brown; mid and hindtibiae brown with pale apices; foretarsi each with small tooth; all tarsi yellowish brown. Forewings pale, with duplicated cilia; subbasal wing setae developed; brownish with expanded apices. Metascutum longitudinally reticulate.

Pelta irregularly triangular. Abdomen slender; tergal lateral setae of tergites well developed, pale. Tergites II to VII each with 2 pairs of wing retaining setae. B1 setae of tergite IX about as long as tube, pointed at apex. Tube brown, with pale apex, shorter than head. Anal setae longer than tube.

Female macroptera. Similar to male in general structure and color but body more robust.

Material examined. 2 females, National Botanical Garden, Real, Quezon, on *Ficus minahasse*, L. C. Raros; 1 male, on *Melastoma* sp., 27-XI-1982, C. P. Reyes; 1 female, on leaves of *Sarcocephalus* sp., 27-II-1982, C. P. Reyes; 1 female, VISCA, Baybay, Leyte, on *Cyperus* leaf sheath, 12-V-1987, C. P. Reyes; 1 female, Agko, Mt. Apo, on bud of *Ficus* sp., 16-IV-1983, C. P. Reyes (**CPRC**).

Distribution (Fig. 76). The known range of this species extends from Taiwan eastward in the Philippine Archipelago to Micronesia. In the Philippines, this species is known from the three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: National Botanical Garden, Real, Quezon; Visayas: VISCA, Baybay, Leyte; Mindanao: Agko, Mt. Apo. TAIWAN. MICRONESIA: Saipan Is., Chalan Kanoa.

Hosts. *Ficus minahasse*, *Melastoma* sp., leaves of *Sarcocephalus* sp., leaf sheath of *Cyperus* sp., bud of *Ficus* sp., *Diospyros discolor*, leaves of *Hibiscus* sp.

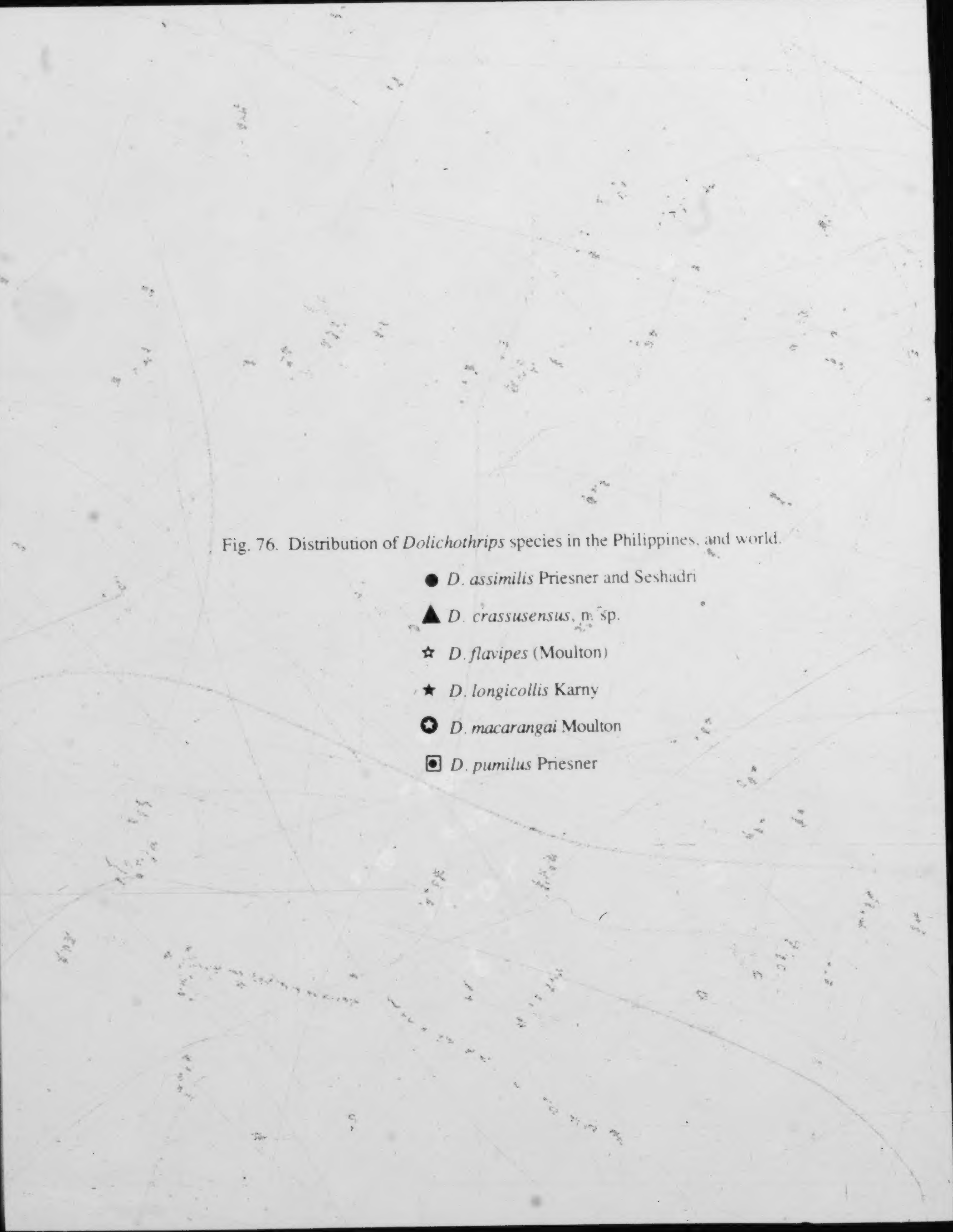


Fig. 76. Distribution of *Dolichothrips* species in the Philippines, and world.

● *D. assimilis* Priesner and Seshadri

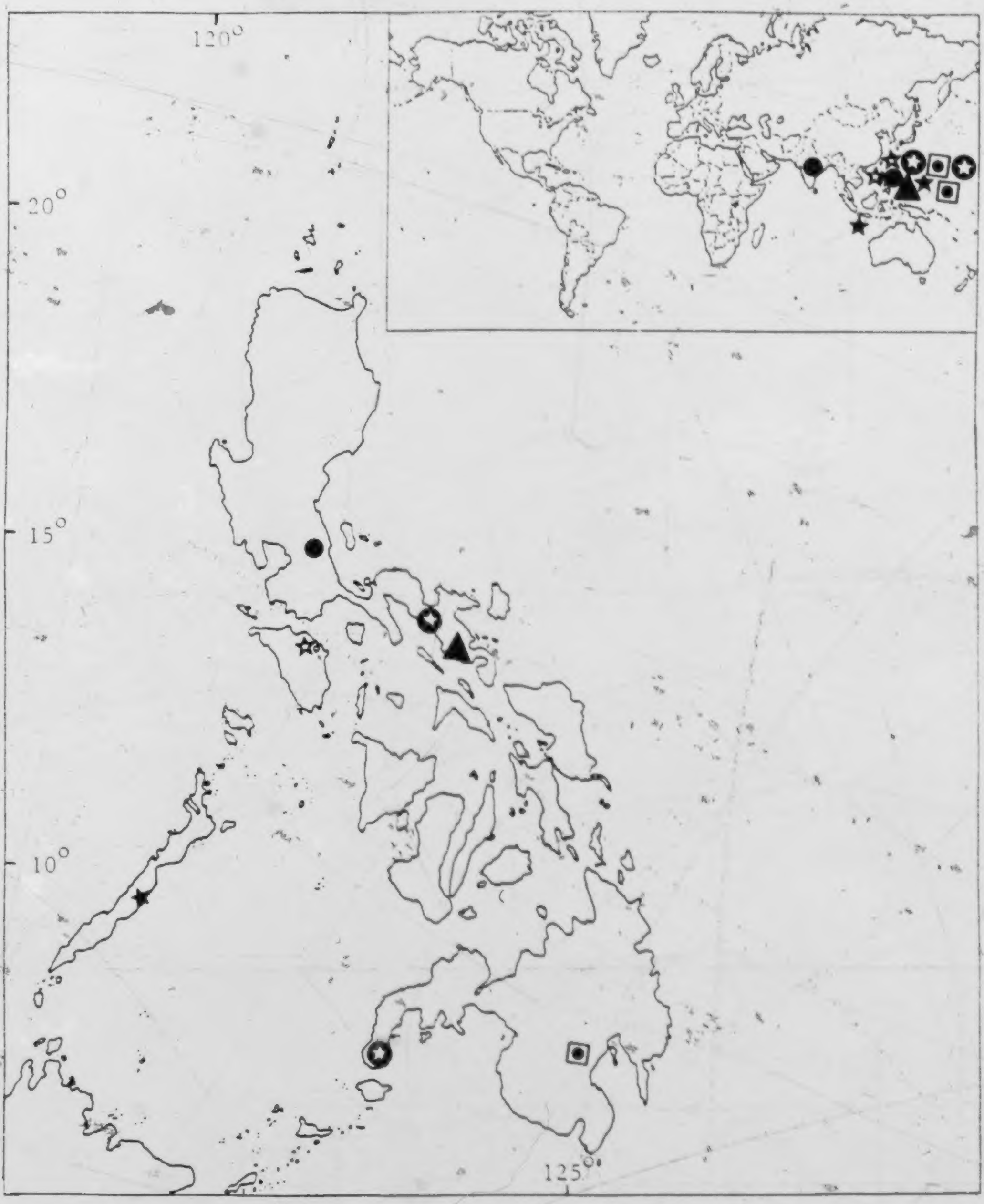
▲ *D. crassusensus*, n. sp.

☆ *D. flavipes* (Moulton)

★ *D. longicollis* Karny

✪ *D. macarangai* Moulton

⊡ *D. pumilus* Priesner


120°
20°
15°
10°
125°

Genus *Ecacanthothrips* Bagnall
Ecacanthothrips Bagnall, 1909c: 348.
Type species: *Acanthothrips sanguineus* Bagnall, by monotypy, a synonym of
Idolothrips tibialis Ashmead, Palmer and Mound, 1978.

Diagnosis. Head with large eyes; cheeks with at least 1 pair of setae borne on small tubercles. Antennae 8-segmented, segment III with enlarged and numerous, stout sense cones; segment IV with 4 stout sense cones. Maxillary stylets retracted into head capsule almost to eye level, closed in middle of head. Mouthcone pointed.

Pronotum transverse, with all major setae developed; anteroangular setae long in males; epimeral sutures complete. Praepectal plates absent. Forefemora of males each with pair of apical tubercles; median forefemoral tubercles present in both sexes; foretarsi each with tooth. Mesonotal lateral setae elongate; metanotum reticulate. Forewings constricted medially, with duplicated cilia .

Pelta bell-shaped, almost triangular in few taxa. Abdominal tergites II-VII each with many wing retaining setae laterally in addition to two major pairs; sternite VIII of males without glandular area.

There are 10 species presently included in *Ecacanthothrips* (Palmer and Mound, 1978; Okajima, 1983a). Adults can be easily distinguished by their numerous, enlarged, sense cones on antennal segment III, and by the well developed tubercle on the inner margin of each forefemur. Adults of all species are macropterous and sexually dimorphic. Three species are known from the Philippines.

Key to Philippine species of *Ecacanthothrips* Bagnall

1 Forefemora each without tooth; head about as long as wide; pelta widely bell-shaped .... *E. tenuicornis* Okajima

1' Forefemora each with tooth; head usually longer than wide to rectangular 2

2(1') Antennal segment III yellow; forewings with 9 to 15 duplicated cilia; all tibiae yellow .... *E. claricornis* Okajima

2' Antennal segment III brown; forewings with 19 to 20 duplicated cilia; mid and hindtibiae brown .... *E. tibialis* (Ashmead)

Ecacanthothrips claricornis Okajima
Ecacanthothrips claricornis Okajima, 1983: 57-59.
Holotype male, Philippines: Mindanao: Agko, Mt. Apo (**Okajima**)[not examined]

Diagnosis. Body brown to dark brown with some hypodermal pigment. Body setae yellow except postocular and anal setae. Head longer than wide. Postocular setae with expanded apices. Antennal segment III yellow, with 10 to 15 large, stout, pale grey sense cones; segment IV with 4 stout sense cones. Pronotal major setae developed. Foretibiae each with 3 to 4 small tubercles on inner margin. Forewings light brown, pale at base and at median constriction, with duplicated cilia. Pelta bell-shaped. Tube shorter than head.

This species is known only from the Philippines. Adults of *E. claricornis* resemble *E. tibialis* in having forefemoral teeth and rectangular head.

Female macroptera. Head longer than wide; reticulate. Ocelli well developed. Eyes about 0.35 times as long as head. Postocular setae about as long as eyes or longer, with expanded apices. Antennal segments I and II dark brown; III and bases of IV and V yellow, IV and V gradually darkened to brownish yellow towards apices; VIII brown; segment III with 10 to 15 large, stout, pale, grey sense cones; IV with 4 stout sense cones. Maxillary stylets retracted to level of postocular setae. Mouthcone pointed.

Pronotum reticulate; major setae developed; anteroangular, anteromarginal and midlateral setae subequal; posteroangular setae longer than epimerals. Forecoxae each with 1 seta with expanded apex; accessory setae 2 pairs, stout with pointed apices; femora dark brown; forefemora each with median tubercle; foretibiae each with 3 to 4 small tubercles on inner margin; mid and hindfemora with stout setae on inner margins of apical third, expanded at apex; all tibiae and tarsi yellow. Forewings shaded with light brown, with base and median constriction pale; duplicated cilia 10 to 13. Metanotum reticulate; reticules with internal markings.

Pelta bell-shaped; reticulate; reticules with internal markings. B1 setae of tergite IX shorter than B2, both shorter than tube. Tube shorter than head. Anal setae longer than tube.

Female macroptera. Similar to male in color. Body size variable. Head about 1.4 to 1.7 times as long as wide. Cheek setae stout, 3 to 4 pairs. Forefemoral tubercle very small to elongate. Forewings with 9 to 15 duplicated cilia.

Material examined. I was not able to borrow Okajima's specimens.

Distribution (Fig. 77). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: Quezon National Forest Park; Bicol National Park; Mindanao: Agko, Mt. Apo; Ilomavis, [Kidapawan], North Cotabato.

Hosts. dead leaves, dead branches.

Ecacanthothrips tenuicornis Okajima
Ecacanthothrips tenuicornis Okajima, 1983a: 63-65.
Holotype female; Philippines: Luzon: Quezon National Park (**Okajima**)[not examined]

Diagnosis. Body dark brown, with pterothorax slightly lighter. Body setae yellowish. Head about as long as wide. Postocular setae with expanded apices. Antennal segment III brown, with pale base and with 7 to 15 large, stout, pale sense cones; segment IV with 4 stout sense cones. Pronotal major setae developed. Forewings light brown, pale at base and at median constriction, with duplicated cilia. Pelta bell-shaped. Tube shorter than head.

This species is known only from the Philippines. *E. tenuicornis* differ from *E. claricornis* and *E. tibialis* in having a short head and for lack of a forefemoral tooth.

Female macroptera. Head about as long as wide; surface reticulate. Ocelli developed and touched inner margins of eyes. Eyes about O.35 times as long as head; slightly prolonged ventrally. Postocular setae longer than eyes, with expanded apices. Cheeks with 3 pairs of short setae, each seta on small tubercle. Antennal segments I and II dark brown; III to VII brown with pale bases; VIII brown; segment III with 7 to 15 large, stout, pale sense cones; segment IV ~~with 4~~ stout sense cones. Maxillary stylets retracted to level of eyes.

Pronotum reticulate; major setae developed; anteroangular setae longer than anteromarginals; posteroangular setae longer than epimerals. Femora dark brown, with pale apices; tibiae and tarsi yellow; anterior margins of mid and hindfemora each with 10 or more fine setae. Forewings shaded with light brown; pale at base and at median constriction; duplicated cilia 8 to 11; subbasal setae well developed, with expanded apices. Metanota reticulate, reticules with or without internal wrinkles.

Pelta bell-shaped. B1 setae of tergite IX shorter than B2, both shorter than tube. Tube shorter than head. Anal setae slightly longer than tube.

Male macroptera. Similar to female in color. Head slightly longer than wide. Postocular setae much longer than eyes. Forefemora enlarged. Pronotum reticulate laterally, with distinct median thickening; anteromarginal setae reduced.

Material examined. 4 females, 1 male, Sipit Saburan, Puerto Gallera, Oriental Mindoro, on *Bambusa* sp., 20-IV-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 77). The known range of this species is confined to the Philippine Archipelago, where it is known from the three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: Quezon National Forest Park; Bicol National Park; Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro; Mindanao: Agko, Mt. Apo.

Hosts. dead leaves, dead leaves of ever green trees, *Bambusa* sp.

Ecacanthothrips tibialis **(Ashmead)**
Idolothrips tibialis Ashmead, 1905: 20.
Holotype female, Philippines: Manila (USNM) [examined]

Diagnosis. Body dark brown. Body setae brown. Head about 2 times as long as wide. Eyes about one-quarter of head length. Postocular setae well developed, with expanded apices. Antennal segment III yellow, with numerous, stout sense cones; segment IV with 4 stout sense cones. Pronotal major setae developed. Foretibiae each with small tooth on inner margin. Forewings brown, with pale base and duplicated cilia. Pelta bell-shaped. Tube shorter than head.

Adults of this species vary in structure and color. Palmer and Mound (1978) observed that structural variation in *E. tibialis* is associated with allometric growth and that color of tibiae and median antennal segments of specimens from the western end of the range of this species have darker appendages than those from the eastern end.

Female macroptera. Head longer than wide; surface reticulate. Ocelli large. Eyes about 0.25 times as long as head. Postocular setae well developed, with expanded apices. Cheeks setae strong, dark. Antennal segment III yellow, with numerous, stout sense cones; segment IV with 4 stout sense cones; segment V and VI with yellow pedicels. Maxillary stylets retracted to level of postoculars. Mouthcone pointed.

Pronotal major setae developed, expanded apically, posteroangular setae longer than epimerals. Forecoxae with stout setae; femora brown; fore and midtibiae, and tarsi yellow; hindtibiae yellow brown to dark brown medially; forefemora each with tooth or tubercle on inner margin; outer margin with numerous setae; foretibiae each with small tooth on inner margin. Forewings shaded with brown, with pale base; duplicated cilia 19 to 20; subbasal wing setae developed, with expanded apices. Metanotum reticulate, reticules with wrinkles.

Pelta bell-shaped, reticulate. B1 setae of tergite IX pale, longer than tube. Tube shorter than head. Anal setae slightly longer than tube.

Male macroptera. Similar to female in color. Body size very variable.

Material examined. 17 females, 8 males, Philippines, VII-1931 (**TMNH**); Manila, on cutlogs; Victorias, on cutlogs (Moulton Coll.) (**CASC**); 1 male, IRRI, Los Banos, Laguna, on *Oryza sativa*, 5-VII-1983, C. Hugo; 1 female, trail to Mudspring, Mt. Makiling, on surface of bark of cutlog, 27-VI-1987, C. P. Reyes; 1 male, Mt. Mayon resthouse, Albay, host unknown, 6-VI-1987, C. P. Reyes; 1 male, Sipit Saburan, Puerto Gallera, Oriental Mindoro, on *Deffenbachia* sp., 19-VI-1987, C. P. Reyes; 1 female, on unknown tree, 19-VI-1987, C. P. Reyes; 1 female, Mt. Pangasugan, Leyte, in malaise trap, 23 to 30-1983, A. Almeroda; 1 female, VISCA, Baybay, Leyte, host unknown, 10-VIII-1983, C. P. Reyes; 1 male, Arevalo, Iloilo, on *Phalaenopsis* sp., 14-III-1985, C. R. Baltazar, 1 male, Forest Research Institute, Camp Susana, La Paz, Zamboanga, host unknown, 12-VII-1987, C. P. Reyes; 1 female, Agko, Mt. Apo, on unknown flower, 5-VI-1987, C. P. Reyes (**CPRC**); 1 female, 4 immatures, Bo. Cale, Tanauan, Batangas, 15-XII-1978, A. Barrion (**IRRI**); **Holotype** female, PHILIPPINES: Manila, R. Brown (**USNM**).

Distribution (Fig. 77). The known range of this species extends from Tanzania eastward in India and to Indo-Australian Archipelago. In the Philippine Archipelago, this species is known from the three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: Manila, taken in quarantine at Seattle; Los Banos, Laguna; trail to Mudspring, Mt. Makiling; Bo. Cale, Tanauan, Batangas; Mt. Mayon resthouse, Albay; Sipit Saburan, Puerto Gallera, Oriental Mindoro; Visayas: Victorias, Negros Occidental; Mt. Pangasugan, Leyte; VISCA: Baybay, Leyte; Arevalo, Iloilo; FORI, Camp Susana, La Paz, Zamboanga; Agko, Mt. Apo. INDONESIA: Sumatra. MALAYSIA: Borneo. SINGAPORE. INDIA: Madras. SRI LANKA. VIETNAM.

TAIWAN. JAPAN. CHINA. NEW GUINEA. AUSTRALIA. MAURITIUS. RODRIGUEZ. TANZANIA.

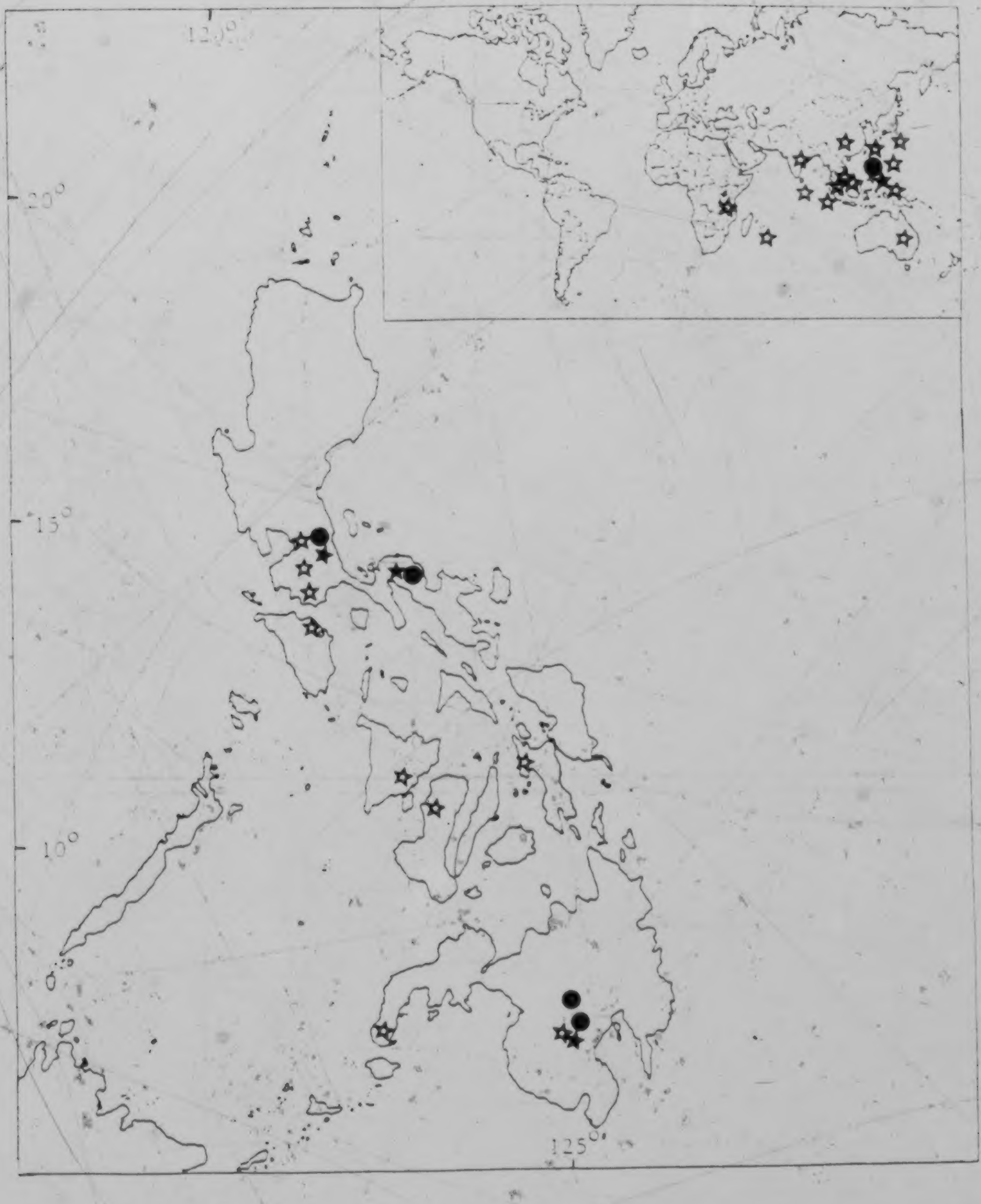
Hosts. cut logs, dead branches and leaves, *Basilornis*, *Deffenbachia*, *Oryza sativa*, *Phalaenopsis*, surface of barks of cut logs, unknown flower, unknown, unknown tree, in malaise trap, bark of uprooted tree, dead tree, under bark, under *Albizzia* bark, dry stem of *Carica papaya*, *Nicotiana tabacum*, dead branches, decayed branch of *Artocarpus* sp., *Gossypium* sp., leaves of *Erythrina indica*, bark of neem, decaying bark of *Moringa moringa*, within dry twigs of *Sesbania* sp., sheaths of *Cocos nucifera*, sheaths of palm, dry sheath of *Areca* sp., dry twigs of *Erythrina* sp., under bark of *Erythrina indica*, *Theobroma cacao*

Fig. 77. Distribution of *Ecacanthothrips* species in the Philippines, and world.

● *E. claricornis* Okajima

★ *E. tenuicornis* Okajima

☆ *E. tibialis* (Ashmead)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20°
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10°
125°

Genus *Eugynothrips* Priesner

Eugynothrips Priesner, 1926: 157
Type species: *Cryptothrips conocephali* Karny, by original designation.

Diagnosis. Head length variable, usually longer than wide, with broad base. Eyes large. Postocular setae 1 pair, moderately long, sometimes vestigial. Cheeks smooth. Antennae 8-segmented, long, slender, with setiform sense cones; segment III with 1 outer sense cone; segment IV with 1 inner and 1 or 2 outer sense cones. Mouthcone broadly rounded, often truncate apically.

Pronotum shorter than head, with 1 pair of conspicuous epimeral setae; anteromarginal setae developed with inner pair vestigial; epimeral sutures complete. Praepectal plates absent. Forefemora slender in females, sometimes thickened or slightly enlarged in males; foretarsi of males each with small tooth that is absent in females. Forewings parallel-sided but slightly tapered towards apex, with duplicated cilia.

Pelta triangular. Abdominal tergites II-VII each with 2 pairs of wing retaining setae. Tube elongate and slightly concave beyond base, sometimes short and evenly conical.

Adults of *Eugynothrips* species resemble those of *Liothrips* Uzel in shape of antennae and number of sense cones on antennal segments III and IV. Members are readily recognized by their long antennae, with setiform sense cones, and broadly rounded mouthcone. Members of this genus differ from those of *Gynaikothrips* by the shape of the antennae and sense cones, the usually shorter head that is never constricted behind the eyes, always smooth cheeks and the constant absence of the tarsal tooth in females (Priesner, 1953). Seventeen species are included in *Eugynothrips* (Jacot-Guillarmod and Brothers, 1986). Only *E. brevisetis* is known from the Philippines.

Eugynothrips brevisetis (Priesner)

Gynaikothrips brevisetis Priesner, 1930a: 263.
Syntypes male and female, Philippines: Mt. Makiling, Laguna (**SMFG**)[examined]

Diagnosis. Body dark brown. Head longer than wide. Postocular setae minute or vestigial. Antennal segments III to VII yellow; segment III vasiform. Pronotal major setae reduced; anteromarginal setae minute; posteroangular setae reduced. Femora slightly enlarged; all tarsi yellow. Pelta triangular. Tube slightly longer than head.

Female macroptera. Head longer than wide; transversely reticulate. Eyes about one-third of head length. Postocular setae minute or vestigial. Cheeks nearly smooth. Antennae slender; sense cones fine or setiform; segments I and II brown, II pale at apex; III to VII yellow; VIII brownish, slightly constricted at base. Mouthcone rounded.

Pronotum transverse; major setae reduced; anteromarginal setae minute; anteroangular setae prominent; posteroangular setae much shorter than epimerals. Femora brown, slightly enlarged; foretibiae brown on basal third, yellow on apical two-thirds; mid and hindtibiae brown, pale on extreme apices; all tarsi yellow. Forewings pale (not spread out, difficult to see). Metascutum longitudinally reticulate.

Pelta triangular. Abdominal tergites transversely reticulate laterally. Tergites II to VII each with 2 pairs of wing retaining setae; laterodorsal setae developed. B1 setae of tergite IX much shorter than tube, dark. Tube brown with pale apex; conical, slightly longer than head. Anal setae short.

Male macroptera. Similar to female in general structure and color. Body smaller in size.

Material examined. Syntypes 3 females, 3 males, 2 pupae, Mt. Makiling, Luzon, on *Conocephalus* sp., C. Baker (**SMFG**).

Distribution (Fig. 79). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. Philippines: Luzon: Mt. Makiling, Laguna.

Host. *Conocephalus* sp.

Genus *Gemmathrips* n. gen.
Type species: *Gemmathrips brevis* n. sp.

Diagnosis. Head about 2 times as long as wide, reticulate, gradually constricted towards base. Eyes medium-sized, with posterior ommatidia enlarged; ocellar setae fine; postocular setae 1 pair, developed, about as long as eyes and rounded at apex; cheek setae fine. Antennae 8-segmented, segment III with 1 sense cone, IV with 2 sense cones. Maxillary stylets short, in form of V in head, not reaching level of postoculars. Maxillary stylets in form of U in the head. Maxillary bridge present. Mouthcone broadly rounded.

Pronotum with major setae developed and with blunt apices; posteroangular setae longer than epimerals; anteromarginal setae vestigial; epimeral sutures incomplete. Praepectal plates absent. Mesopraesternum boat-shaped. Forefemora enlarged, foretarsi each without tooth. Forewings parallel-sided with duplicated cilia. Meso and metanotum reticulate.

Pelta broadly triangular, reticulate, with pair of campaniform sensilla. Abdominal tergites II-VII each with 2 pairs of wing retaining setae. B1 setae of tergite IX longer than tube, pointed at apex. Tube shorter than head. Sternite VIII without glandular areas in males.

Adults of *Gemmathrips* n. gen. species have eyes with enlarged posterior ommatidia as in those of *Manothrips* Priesner, *Praeciputhrips* n. gen. and *Rosingothrips* n. gen. Members of *Gemmathrips* n. gen. differ from those of *Manothrips* in the following characters: maxillary bridge present; broadly rounded mouthcone; enlarged femora; lack of spine-like setae on cheeks and shape of antennal segments. They differ from those of *Praeciputhrips* in the shape and length of head; presence of maxillary bridge; 2 sense cones on antennal segment IV (3 moderately stout sense cones in *Praeciputhrips*, n. gen.); shorter maxillary stylets which are not lying close in the middle of the head; shape of pelta and body color. *Gemmathrips* n. gen. differ from those of *Rosingothrips* n.

gen. by the following characters: maxillary bridge present; maxillary stylets not forming a V in the head; slender cheek setae; forewings almost parallel-sided to apex; eyes almost equally developed on dorsal and ventral surface; and 2 sense cones on antennal segment IV (4 sense cones on *Rosingothrips*, n. gen.).

Etymology. Gemma is a Latin word meaning "eye" (*Gemmathrips* = eye thrips) and emphasizes the large, posterior ommatidia of the compound eyes of these thrips.

***Gemmathrips brevis* n.sp.**
Holotype female, Philippines: Visayas: Mt. Pangasugan, Leyte (**UPLB**)
Figure 78a, b, c, d

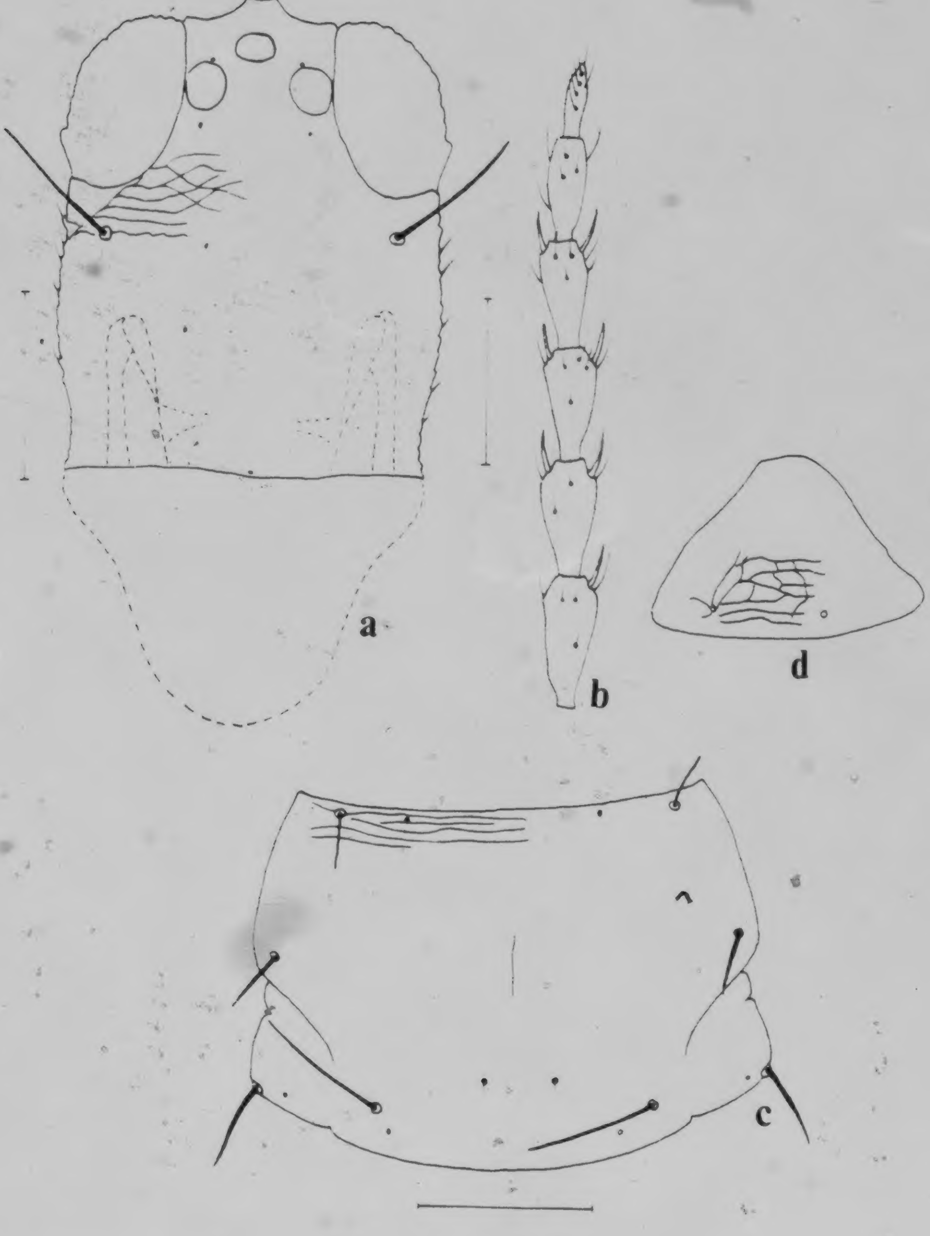
Diagnosis. Body dark brown. Body setae developed, pale. Eyes with enlarged posterior ommatidia. Cheek setae slender. Antennal segments III and IV with 1 and 2 sense cones respectively. Maxillary stylets in form of U in head, less than one half of head length; maxillary bridge incomplete. Pronotal major setae with blunt apices; anteromarginal and posteromarginal setae vestigial. Legs predominantly brown; forefemora enlarged; foretarsi each without tooth. Forewings pale, with dark lateral margins. Pelta broadly triangular. Tube shorter than head.

In addition to the characters mentioned in the generic description, adults of this species differ from those of *R. ommatus* n. sp. in having postocular setae with rounded apices; anteroangular setae conspicuous; pelta with a pair of campaniform sensilla and posterior pair of wing retaining setae on tergites hook-shaped. This species seems to be widely distributed in the Philippines.

Female macroptera. Head longer than wide, slightly constricted towards base; transversely striate (Fig. 78a). Ocellar setae short, fine. Eyes with enlarged posterior ommatidia. Postocular setae developed, shorter than eyes, with rounded apices. Cheek setae slender. Antennal segments I, VII and VIII brown; II brown with pale base; III to V yellow, tinged with brown apically; VI pale on basal two-thirds, brown on apical third; segment VIII elongate, constricted at base; segments III and IV with 1 and 2 sense cones respectively (Fig. 78b). Maxillary stylets in form of U in head, less than one half of head length; maxillary bridge incomplete. Mouthcone rounded (Fig. 78a).

Pronotum with weak, transverse striae; major setae with blunt apices; anteroangular setae conspicuous; anteromarginal and posteromarginal setae vestigial; posteroangular setae longer than epimerals (Fig. 78c). Legs brown with pale tarsi; forefemora enlarged; foretarsi without tooth. Forewings pale, with dark lateral margins and with 12 to 16

Fig. 78. *Gemmathrips brevis*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta


a
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duplicated cilia; posterior fringe cilia brownish. Meso and metanota reticulate.Pelta broadly triangular; reticulate, with a pair of campaniform sensilla (Fig. 78d). Tergites II to VII each with 2 pairs of wing retaining setae; posterior pair longer than anterior pair and hook-shaped. Tergal lateral setae pale, developed, with pointed apices. B1 setae of tergite IX longer than tube, with pointed apices; B2 setae shorter than B1. Tube shorter than head; dark with light brown apex. Anal setae shorter than tube.

Dimensions (holotype female, um). Body length (extended) 2400.4. Head length 278.8, median width 193.8; eyes length 93.5; postocular setae length 76.5; antennal segments length: I 42.5; II 61.2; III 74.8; IV 66.3; V 66.3; VI 63.8; VII 59.5; VIII 54.4. Pronotum length 204, median width 265.2, major setae length: aa 45.9; ml 57.8; pa 91.8; ep 69.7. Tergite IX setae: B1 193.8; B2 57.8; B3 176.8. Tube length: 224.4.

Type data. **Holotype female**, PHILIPPINES: Mt. Pangasugan, Baybay, Leyte, on undetermined shrub, 21-II-1983, L. C. Raros (**UPLB**). **Paratypes** (5 females, 4 males) same data as holotype (**UPLB**).

Male macroptera. Similar to female in general structure and color. Body smaller. Forewings with few duplicated cilia.

Dimensions (allotype male; um). Body length (extended) 2033.2. Head length 241.4, median width 190.4; eyes length 85; postocular setae length 71.4; antennal segments length: I 54.4; II 54.4; III 71.4; IV 68; V 61.2; VI 57.8; VII 57.8; VIII 57.8. Pronotum length 187, median width 272, major setae length: aa 38.8; ml 47.6; pa 81.6; ep 62.9. Tergite IX setae: B1 180.2; B2 23.8; B3 27.2. Tube length: 180.2.

Material examined. Type series. Others. 2 females, 4 males, VISCA, Baybay, Leyte, on *Symplocos ahernii*, 6-V-1983, C. P. Reyes; 1 male, IRRI, College, Laguna, on *Thevelia peruxiana*, 4-X-1983, C. P. Reyes; 1 male, UPLB, Los Banos, Laguna, on *Hyptis brevipes*, 20-X-1982, C. P. Reyes (**CPRC**).

Etymology. Brevis is a Latin word meaning "short" and refers to the incomplete or short maxillary bridge of these thrips.

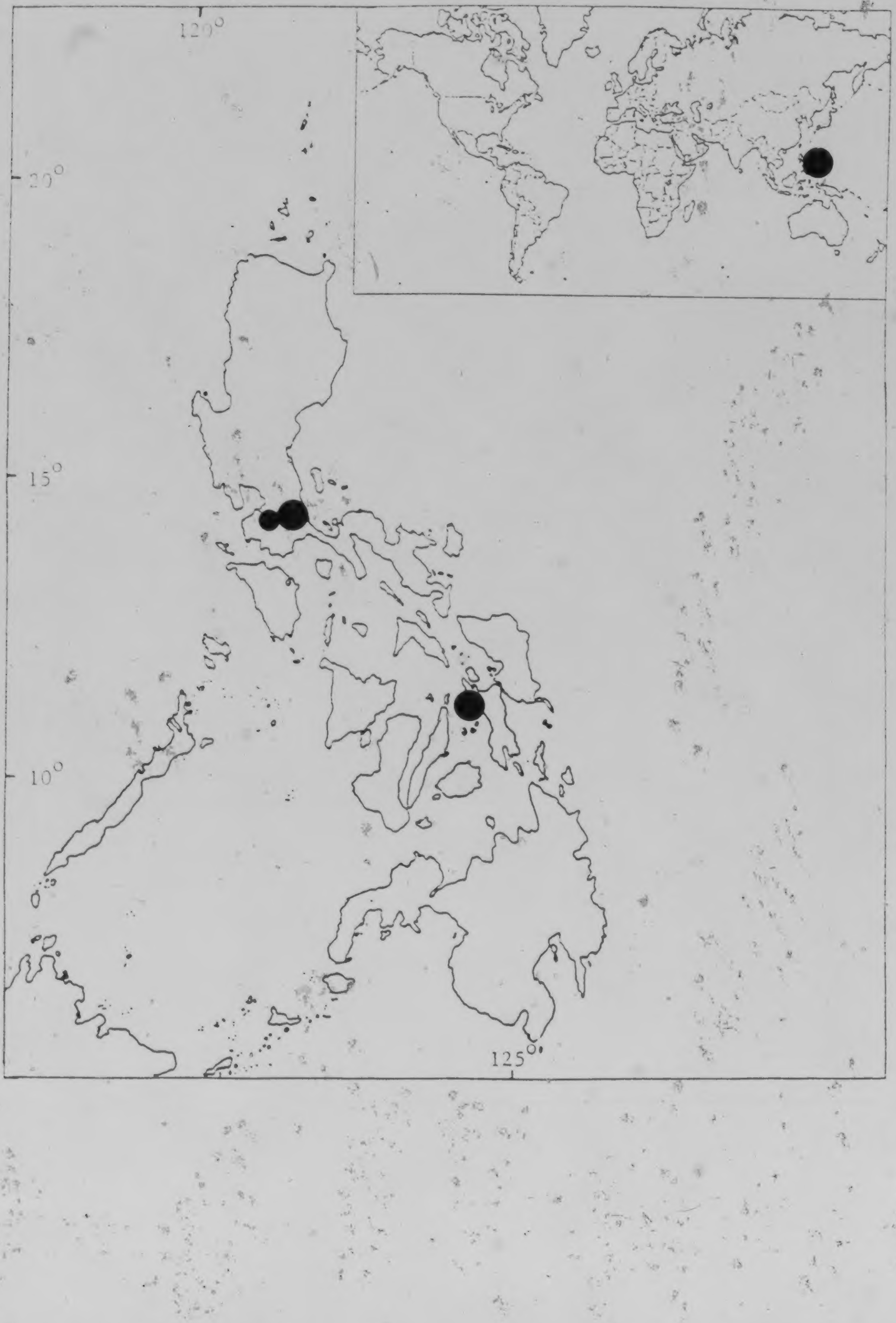
Distribution (Fig. 79). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Luzon and Visayas. PHILIPPINES: Luzon: UPLB, Los Banos, Laguna; IRRI, Los Banos, Laguna; Visayas: Baybay, Leyte.

Hosts. undetermined shrub, *Symplocos ahernii*, *Thevelia peruxiana*, *Hyptis brevipes*

Fig. 79. Distribution of *Eugynothrips brevisetis* (Priesner) and *Gemmathrips brevis*, n. sp in the Philippines.

● *Eugynothrips brevisetis* (Priesner)

★ *Gemmathrips brevis*, n. sp.



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20°
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Genus *Gynaikothrips* Zimmermann

Gynaikothrips Zimmermann 1900: 13.
Type species: *Mesothrips uzeli* Zimmermann, by monotypy.
Gigantothrips Zimmermann, 1900: 18. Type species: *Gigantothrips elegans* Zimmermann, by monotypy, **new synonymn**

Diagnosis. Head elongate, slightly reticulate. Fore ocellus borne on prominent hump. Eyes moderately large, closed together. Postocular setae minute to developed. Antennae 8-segmented; intermediate antennal segments elongate to moderately long; segment III with 1 sense cone; segment IV with 2 or 3 sense cones. Maxillary stylets short to retracted halfway into head capsule or extended level of postocular setae. Mouthcone elongate, broadly rounded.

Pronotum with sculpture of irregularly twisted striae or weakly hexagonal reticulations; epimeral sutures complete or incomplete. Praepectal plates absent; mesopraesternum well developed. Forefemora slender; foretarsi each with or without small tooth in both sexes. Forewings parallel-sided, with duplicated cilia.

Pelta triangular to hat-shaped, small to moderate in size, occasionally with 2 additional lateral lobes. Apical abdominal tergites elongate; tergites II -VII each with 2 or more pairs of wing retaining setae. Tube long, often hairy and slightly bowed.

Gigantothrips Zimmermann is here synonymized with *Gynaikothrips* Zimmermann since adult members of these genera are indistinguishable except for the longer intermediate antennal segments and body, additional pairs of wing retaining and accessory setae, and presence of foretarsal tooth in *Gigantothrips* species. I do not find these characters stable enough to maintain two genera. The additional pairs of wing retaining and accessory setae in members of the latter genus may be one response to larger body size and broader wings. Members of other genera with larger bodies also possess such additional hairs. The presence or absence of a small foretarsal tooth is usually sex related and sometimes varies within individuals of the same species. Some specimens from the Philippines possess characters that grade from those of *Gynaikothrips* adults to *Gigantothrips* adults. Adults of *G. pontis*, n. sp. and *G. xynos*, n. sp, have a moderately large body with moderately long antennal segments and head, lateral sides of tergites warty; accessory setae on tergites numerous; wing retaining setae on tergites II, VI and VII 2 pairs, while those of III to V have 4 pairs, foretarsi each with a small tooth and pronotum with twisted striae. In addition, the type species of *Gynaikothrips* , *G. uzeli* (Zimmermann) differs from *Gigantothrips elegans*, the type species of *Gigantothrips* only in having shorter intermediate antennal segments, head, tube and body, and fewer wing retaining and accessory setae. The characters that distinguish these two type species are of specific significance only. Adults of all species of *Gynaikothrips* and *Gigantothrips* have a broad mouthcone; with 1 sense cone on antennal segment III and 2 or 3 on IV; intermediate antennal segments elongate to long; pronotum with strong or weakly twisted striae and wings parallel sided. By the rule of page priority, the name *Gynaikothrips* Zimmermann has priority over *Gigantothrips* Zimmermann. Stannard (1957) and Jacot-Guillarmod and Brothers (1986) provided information regarding the controversy over authorship of *Gynaikothrips* . Stannard (1957) attributed *Gynaikothrips* to Karny while Jacot-Guillarmod and Brothers (1986) by citing Articles 11, 12 and 16 of the International Code of Zoological Nomenclature (1964) attributed this genus to Zimmermann.

Gynaikothrips are medium-sized to large thrips distributed mainly in the Orient with a few species known from the New World. Members of most species are associated with various species of *Ficus* where some of them produce leaf galls. About 86 species are presently included in this genus (Mound and Houston, 1987) of which only 7 species are known from the Philippines.

Key to Philippine species of *Gynaikothrips* Zimmermann

1 Antennal segments robust (Fig. 81b); head slightly longer than wide; eyes prolonged ventrally (Fig. 81a) .... *G. pedanus*, n. sp.

1' Antennal segments moderately elongate; head longer than wide; eyes not prolonged ventrally 2

2(1') Abdominal tergites III and IV each with 3 or more pairs of wing retaining setae 3

2' Abdominal tergites III and IV each with 2 pairs of wing retaining setae 5

3(2) Antennal segments III and IV much elongate; III about 1.3 times as long as segment IV; tube about 1.4 times as long as head; anteromarginal setae of pronotum well-developed .... *G. elegans* (Zimmermann)

3' Antennal segments III and IV moderately elongate; III about 1.1 times as long as segment IV; tube about 1.2 times as long as head; anteromarginal setae reduced 4

4(3') Maxillary stylets reaching level of postocular setae, lying close together towards the base of head (Fig. 82a); B1 setae of abdominal tergite IX short and stout, rounded apically .... *G. pontis*, n. sp.

4' Maxillary stylets short, lying almost parallel to each other at the base of the head (Fig. 83a); B1 setae of abdominal tergite IX long and slender, almost pointed apically .... *G. xynos* n. sp.

5(2') Posteroangular setae of pronotum reduced (Fig. 80c); head about 1.2 times as long as wide; maxillary stylets barely retracted into base of head (Fig. 80a) .... *G. capitulatus*, n. sp.

5' Posteroangular setae of pronotum well developed; head at least 1.5 times as long as wide; maxillary stylets at least about one third as long as head 6

6(5') Postocular setae short, about 0.6 times as long as eyes; head widest towards base .... *G. uzeli* Zimmermann

6' Postocular setae longer, about as long as eyes or longer; head slightly constricted towards base .... *G. luzonensis* Priesner

***Gynaikothrips capitulatus*, n. sp.**
Holotype female, Philippines: Mindanao: Anuling, Pamocotan, Zamboanga (**UPLB**)
Figure 80a, b, c, d

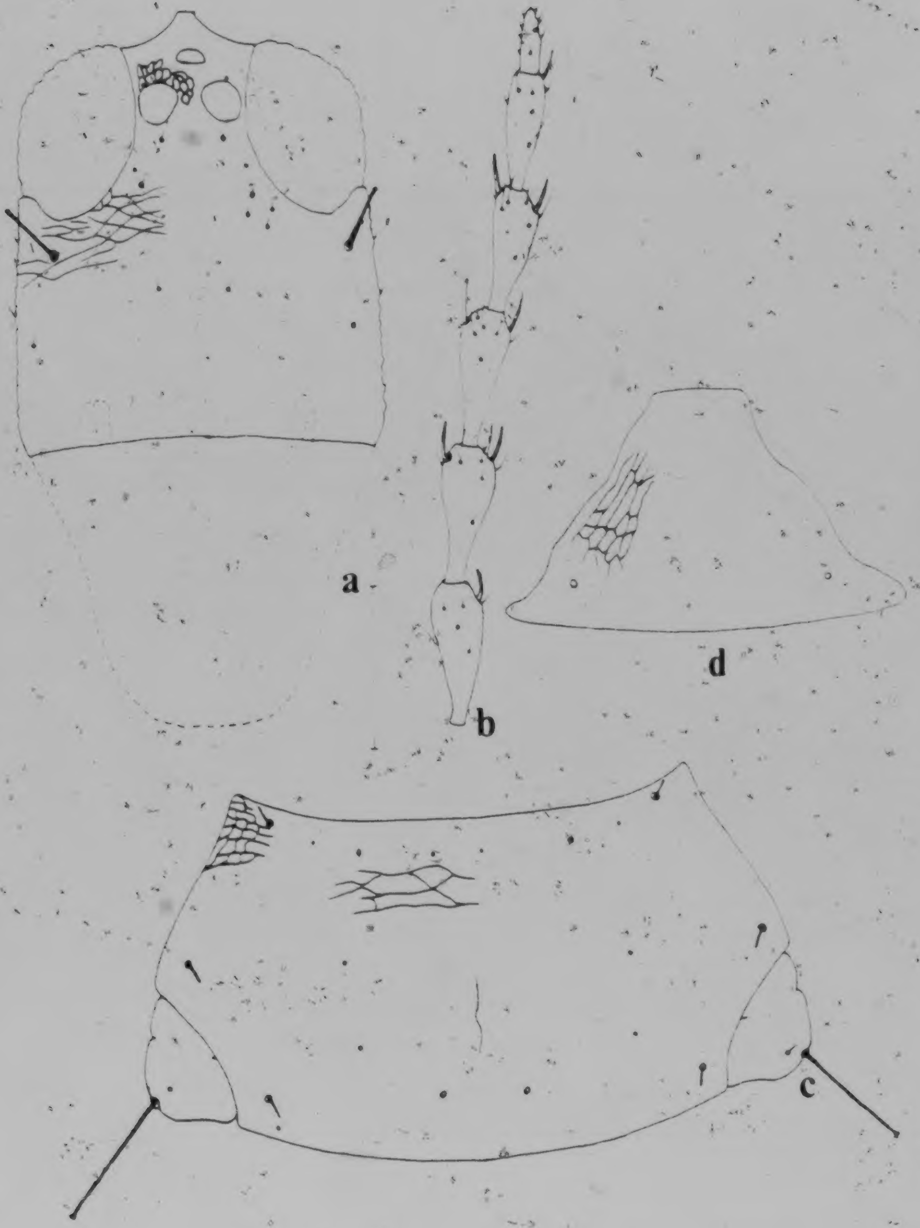
Diagnosis. Body dark brown. Head slightly longer than wide. Eyes about one-third of head length. Postocular setae developed, slightly dilated at apex. Antennal segments elongate and slender. Pronotal major setae reduced except epimeral setae developed. Legs bicolored; foretarsi with out tooth. Forewings light brown, with duplicated cilia. Pelta triangular. Abdominal tergites II to VII each with 2 pairs of wing retaining setae. B1 setae of tergite IX developed. Tube longer than head.

Adults of this species are similar to those of *G. pedanus*, n. sp. in having a short head and short maxillary stylets. Members of this species differ from the latter by the shape of their antennal segments and pelta. Their pronotal anteromarginal setae are vestigial whereas those of *G. pedanus*, n. sp. are well developed. This species is known only from the type material.

Female macroptera. Head slightly longer than wide; reticulate and with several pairs of minute setae medially (Fig. 80a). Eyes more than one-third as long as head. Postocular setae shorter than eyes, with slightly dilated apices. Antennal segments elongate and slender, about 2.0 times as long as head; segments I and II brown, II pale apically; III to VIII yellow; III slightly longer than segment IV; segment III with 1 inner sense cone; IV with 1 inner and 2 outer sense cones (Fig. 80b). Maxillary stylets short. Mouthcone short, broadly rounded (Fig.80a).

Pronotum reticulate; major setae reduced; anteromarginal setae vestigial; epimeral setae prominent (Fig. 80c). Forefemora brown, with pale apices; mid and hindfemora brown; foretibiae yellow; mid and hindtibiae brown with pale apices; tarsi yellow; foretarsi without a tooth. Forewings shaded with light brown, each with 14 duplicated cilia; subbasal wing setae well developed, with knobbed apices; setae S3 longest. Mesonotum with transverse reticulation. Metascutum with longitudinal reticulation; median setae small.

Fig. 80. *Gynaikothrips capitulatus*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta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Pelta triangular, reticulate; a pair of campaniform sensilla present (Fig. 80d). Anterior third of abdominal tergite II smooth, posterior two-thirds reticulate. Tergites II to VII each with 2 pairs of wing retaining setae; anterior pair slender, simply curved; posterior pair stout, long, curved. B1 setae of tergite IX shorter than tube and pointed at apex. Tube longer than head, dark brown, pale basally and apically. Anal setae short.

Dimension (holotype female; um). Body length (extended) 3352.4. Head length 275.4, median width 238; dorsal eye length 110.5; postocular setae length 35.7; antennal segments length: I 47.6; II 68; III 91.8; IV 90.1; V 81.6; VI 79.9; VII 69.7; VIII 44.2. Pronotum length 241.4, median width 408; major setae length: aa 18.7, ml 23.8, pa 20.4, ep 110.5. Tergite IX setae: B1 299.2, B2 351.9, B3 319.6. Tube length: 401.2.

Type data. **Holotype** female, PHILIPPINES: Mindanao: Anuling, Pamocotan, Zamboanga, on leaf of unknown plant, II-VII-1987, C.P.Reyes (**UPLB**).

Male. Unknown.

Material examined. **Holotype** only (**UPLB**).

Etymology. Capitulatus is a Latin word meaning having a small head.

Distribution (Fig. 84). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Mindanao. PHILIPPINES: Mindanao: Anuling, Pamocotan, Zamboanga.

Host. leaf of unknown plant

Gynaikothrips elegans (Zimmermann) n. comb.
Gigantothrips elegans Zimmermann, 1900: 18.
Holotype female, Indonesia: Buitenzorg, Java (**SMFG**)[examined]
Gigantothirps elegans Zimmermann, Uichanco, 1919: 547.
Gigantothips crawfordi Hood, 1919a: 71.

Diagnosis. Body brown. Body setae yellowish brown. Head rectangular, surface reticulate and with small warts. Eyes moderately large, protruded. Postocular setae shorter than length of eyes. Antennal segment III yellow, elongate, much longer than segment IV. Pronotum setose; anteromarginal setae developed; epimeral setae longer than posteroangulars. Legs bicolored. Forewings pale, with numerous duplicated cilia. Pelta hat-shaped. Abdominal tergites II to VII each with 4 or more pairs of wing retaining setae. Tube much longer than head.

Adults of this species are large thrips with long antennae and are easily distinguished from *G. pontis* n. sp. and *G. xynos*, n. sp. in having antennal segment III much longer than IV, and pronotum with many well developed setae.

Female macroptera. Head more than 2.0 times as long as wide; surface reticulate and with a small warts. Ocellar hump prominent. Ocelli large. Eyes protruded, about one-third of head length. Postocular setae shorter than eye length. Cheeks setae few, moderately strong. Antennal segments I and II brown, II pale at apex; III to VIII slender, elongate; III yellow, about 1.3 times as long as IV; IV and V mostly yellow with brownish apices; VI yellow on basal half, brown on apical half; VII and VIII brown; segment III with 1 outer sense cone; segment IV with 1 inner and 1 outer sense cones. Mouthcone broadly rounded.

Pronotum reticulate and setose; anteromarginal setae developed; posteroangular and epimeral setae well developed, with knobbed apices. Legs slender, femora brown, with pale apices; foretibiae yellow; mid and hindtibiae brown in basal third, yellow on apical two-thirds. Forewings pale each with 25 to 30 duplicated cilia. Meso and metanota reticulate.

Pelta hat-shaped; reticulate, with raised sculpture medially; pair of campaniform sensilla absent or present. Abdomen slender; tergites with strong lateral reticulation. Tergite II with 4 pairs of wing retaining setae; III to VII with 5 or more pairs of such setae; lateral accessory setae of tergites numerous. B1 setae of tergite IX much shorter than tube. Tube about 1.4 times as long as head, with moderately developed lateral setae. Anal setae about as long or longer than B1 setae of tergite IX.

Male macroptera. Similar to female in general structure and color but head shorter and body more slender.

Material examined. 2 females, Manila, on *Ficus* sp., 19-V-1964, N. Krauss (**BPBM**); 1 female, San Jose, Mindoro, on jungle, E. Ross (Moulton Coll.) (**CASC**); 7 females, 2 males, UPLB, Laguna, on *Tagetes erecta*, 17-IX-1984, E. Mituda; 2 females, on *Ficus odorata*, 15-II-1981, M. Mendoza; 10 females, 3 males, on *Artocarpus integrifolia*, 16-II-1981, C. P. Reyes; 4 females, on unknown tree, 2-VII-1981, T. Marcos; 1 female, on *Ficus* sp., 15-II-1981, D. Amalin; 2 females, on *Ficus odorata*, 15-II-1981, N. Jayma; 2 females, 15-II-1985, on *Ficus odorata*, M. Navasero; 4 females, outside galls, on figs, 13-VII-1974, L. C. Raros; 8 females, on *Ficus pseudopalma*, 26-XI-1982, C. P. Reyes; 3 females, National Botanical Garden, Real, Quezon, on leaf of *Ficus* sp., 27-II-1982, C. P. Reyes; 1 female, on *Ficus* sp., 27-IX-1982, C. P. Reyes; 1 female, 1 male, PNAC, Aborlan, Palawan, on *Ficus pseudopalma*, 26-I-1985, C. P. Reyes; 1 female, 1 male, Sipit Saburan, Puerto Gallera, Oriental Mindoro, on *Ficus benjamina*, 20-VI-1987, C. P. Reyes; 3 females, Mt. Pangasugan, Baybay, Leyte, on *Carica papaya*, 6-V-1983, C. P. Reyes; 1 male, on flower of "tagbak", 6-V-1983, C. P. Reyes; 1 female, Gabok, Canlaon, Negros Occidental, on *Commelina benghalensis*, 12-V-1985, C. P. Reyes; 8 females, Anuling, Pamocotan, Zamboanga, on *Ficus* sp., 11-VII-1987, C. P. Reyes (**CPRC**); 1 female, UPLB, Los Banos, Laguna, on outside leaf galls of *Ficus* sp., 13-VII-1974, V. P. Gapud (**VISCA**).

Distribution. The known range of this species extends from India eastward in the Indonesia Archipelago to Australia. In the Philippine Archipelago, this species is known from the four principal zoogeographic regions, on the islands of Luzon, Palawan, Visayas and Mindanao. PHILIPPINES: Luzon: Manila; UPLB, Los Banos, Laguna; Los Banos, Laguna; National Botanical Garden, Real Quezon, Palawan: PNAC, Aborlan; Visayas: San Jose, Mindoro; Sipit Saburan, Puerto Gallera, Oriental Mindoro; Mt. Pangasugan, Baybay, Leyte; Gabok, Canlaon, Negros Occidental; Mindanao: Anuling, Pamocotan, Zamboanga. INDONESIA: Sebesi; Java; Roban Urwald, Semarang. MALAYSIA. THAILAND. HONGKONG. PAPUA NEW GUINEA. AUSTRALIA. TAIWAN. INDIA (Fig. 84).

Hosts. *Tagetes erecta*, *Ficus odorata*, *Artocarpus integrifolia*, unknown tree, *Ficus* sp., outside leaf galls of *Ficus* sp., leaf of *Ficus* sp., *Ficus benjamina*, *Carica papaya*, "tagbak" flower, *Commelina benghalensis*, curled up leaves and galls on *Ficus* spp., *Ficus retusa*, *F. glomerata* var *elongata*, *F. obtusa*, *F. nervosa*, *F. wightiana*, *F. bengalensis*, young top leaves of Waringin tree, on botree. Many individuals of *G. elegans* were taken from undersurface of leaves of *Ficus pseudopalma* from Los Banos, Laguna. Many individuals of different life stages were found aggregating. In my collection, about 100 of these thrips are still in vials.

Gynaikothrips luzonensis Priesner

Gynaikothrips luzonensis Priesner, 1939a: 480, 486. Female, male.
Holotype female, Philippines: Los Banos, Laguna(**SMFG**) [examined]

Diagnosis. Body dark brown. Body setae yellowish brown. Head longer than wide, with 4 pairs of small median setae. Ocellar hump prominent. Eyes large. Postocular setae longer than dorsal length of eyes, with blunt apices. Antennal segment III longer and more slender than segment IV. Pronotal major setae reduced, with knobbed apices; anteromarginal setae minute. Legs bicolored. Forewings pale, each with 18 to 19 duplicated cilia. Pelta triangular. Abdominal tergites II to VII each with 2 pairs of wing retaining setae. Tube longer than head.

Adults of this species differ from those of *G. uzeli* in the shape of the head and pelta, well developed postocular setae, and presence of 4 pairs of small median setae in the head.

Female macroptera. Head longer than wide, surface reticulate, with 4 pairs of small median setae. Ocellar hump prominent; ocelli large; posterior pair touching inner margins of eyes. Eyes large. Postocular setae developed, longer than length of eyes. Cheek setae slightly developed. Antennal segments I and II brown, II pale in apical half; III to VIII yellowish; III longer and more slender than segment IV, with 1 outer sense cone; segment IV with 1 inner and 1 outer sense cones. Maxillary stylets retracted about one third of head length. Mouthcone broadly rounded.

Pronotal major setae reduced, with knobbed apices; anteromarginal setae minute; anteroangular setae reduced; posteroangular setae shorter than epimerals, with knobbed apices. Femora brown, each with pale, apical wedge-like area; foretibiae yellow in apical two thirds, brown in basal third; mid and hindtibiae brown in basal two-thirds, yellow on apical third; tarsi yellow; foretarsi with or without small tooth. Forewings pale, each with 18 to 19 duplicated cilia; subbasal wing setae well developed, with knobbed apices, setae S3 longest. Meso and metanota reticulate.

Pelta triangular; reticulate, with raised sculpture medially; pair of campaniform sensilla present. Abdominal tergites with small warts and strong reticulation laterally; lateral accessory setae of tergites numerous. Tergite II to VII each with 2 pairs of wing retaining setae. B1 setae of tergite IX about 0.65 times as long as tube and with pointed apices. Tube longer than head, with minute lateral setae. Anal setae shorter than B1 setae of tergite IX.

Male macroptera. Similar to female in general structure and color but body smaller.

Material examined. 3 females, UPLB, Laguna, on leaves of *Ficus balete*, 25-XI-1982, C. P. Reyes; 1 female, on *Ficus balete*, 27-IX-1982, C. P. Reyes; 3 males, UPLB, Laguna, on *Ficus balete*, 8-XII-1982, J. Balatibat; 3 females, on *Ficus* sp., 8-II-1984, I. Lit Jr.; 4 males, on leaves of *Ficus* sp., 5-I-1980, I. Lit Jr.; 6 females, on 'bignai" tree, V. Fernando; 1 female, on *Ficus elastica*, 27-IX-1982, C. P. Reyes; 2 females, on *Ficus benjamina*, 9-VII-1987, C. P. Reyes; 1 female, Mudspring, Mt. Makiling, on Lauraceae, 27-VI-1987, C. P. Reyes; 2 females, 1 male, National Botanical Garden, Real, Quezon, on leaves of *Ficus balete*, 27-I-1983, C. P. Reyes; 5 females, 3 males, Anuling, Pamocotan, Zamboanga, on *Ficus* sp., 11-VII-1987, C. P. Reyes (**CPRC**); 1 female, Los Banos, Laguna, on *Ricinus communis*, 18-XI-1978, A. Barrion (**IRRI**); **Holotype** female, PHILIPPINES: Los Banos, Laguna, on *Ficus* sp., C. F. Baker; **Paratypes** (6 females, 1 male) same data as holotype (**SMFG**).

Distribution (Fig. 84). The known range of this species extends from Taiwan to the Philippine Archipelago. In the Philippines, this species is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: UPLB, Los Banos, Laguna; Los Banos, Laguna; National Botanic Garden, Real, Quezon; Mindanao: Anuling, Pamocotan, Zamboanga. TAIWAN.

Hosts. *Ficus* sp., *Ficus balete*, leaves of *Ficus* sp., *Ficus elastica*, *Ficus benjamina*, 'bignai" tree, leaves of *Ficus balete*, *Ricinus communis*, *Ficus retusa*

***Gynaikothrips pedanus*, n.sp.**
Holotype female, Philippines: Luzon: Gaggabutan Forest, Rizal, Cagayan (**UPLB**)
Figure 81a, b, c, d

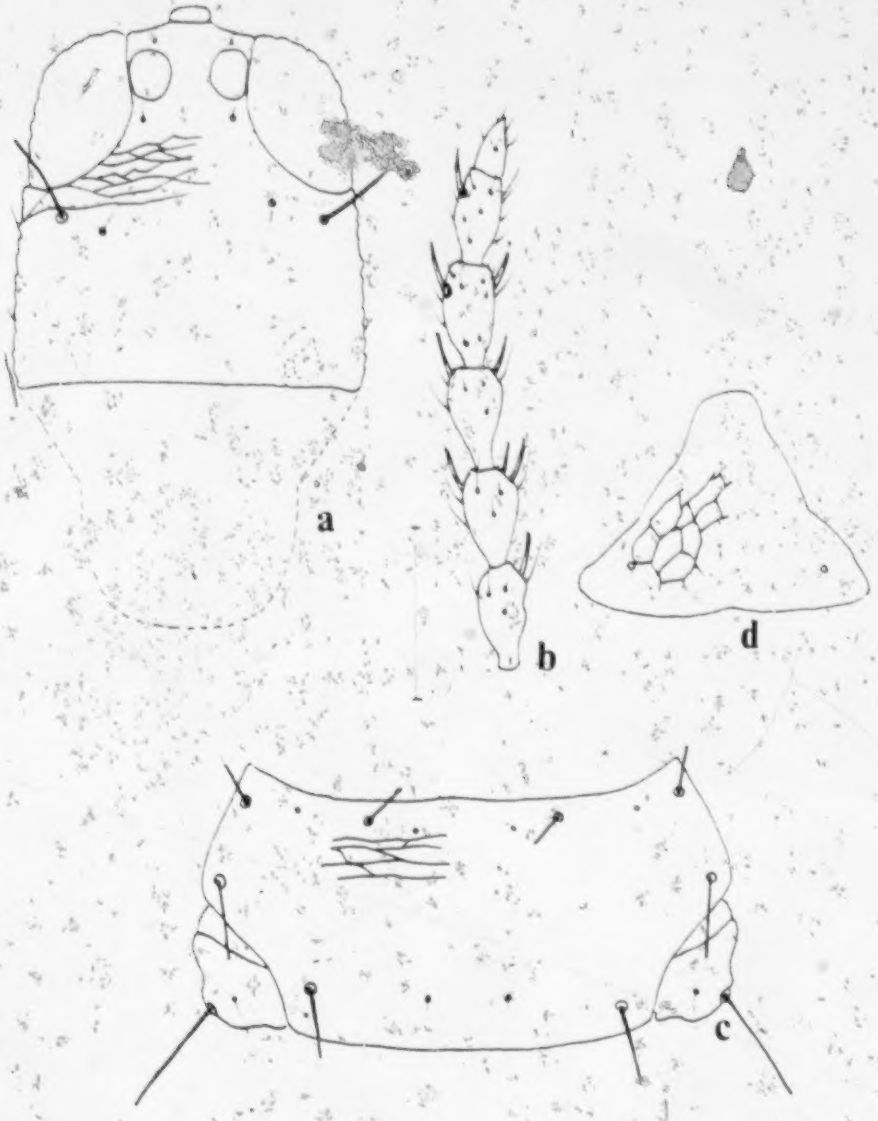
Diagnosis. Body brown. Head longer than wide; reticulate. Eyes prolonged ventrally. Postocular setae well developed. Antennal segments robust; segments III and IV with 1 and 3 sense cones respectively. Pronotal major setae well developed, with blunt apices; epimeral setae longer than posteroangulars. Legs bicolored; foretarsi each without a tooth. Forewings shaded with brown medially, with duplicated cilia. Pelta triangular. Tube longer than head.

Unlike other members of the genus, adult of this species have a short head, stouter body, and more robust antennal segments. Adults of *G. pedanus* resemble those of *G. capitulatus*, n. sp. in having short maxillary stylets reaching anteriorly into base of head. This species is known only from the type material.

Female macroptera. Head slightly wider than long; reticulate; brown with dark brown lateral margins (Fig. 81a). Ocelli large; posterior pair touching anteromedian margins of eyes. Postocellar setae small. Eyes prolonged ventrally. Postocular setae shorter than dorsal length of eyes. Antennal segments robust; segments I and II brown, II pale apically; III to VIII yellow; segment III with 1 outer sense cone; IV with 1 inner and 2 outer sense cones (Fig. 81b). Maxillary stylets short, reaching anteriorly into base of head. Mouthcone broadly rounded (Fig. 81a).

Pronotum transverse, reticulate; major setae well developed, with blunt apices; anteromarginal setae shorter than anteroangulars, midlateral setae longer than anteroangulars; epimeral setae longer than posteroangulars (Fig. 81c). Femora brown; foretibiae yellow; mid and hindtibiae brown, pale basally and apically; tarsi yellow; foretarsi each without a tooth. Forewings shaded with brown medially, with 8 to 10 duplicated cilia; subbasal wing setae well developed, with blunt apices; setae S3 longest. Mesonotum with dark brown margins. Metascutum with longitudinal reticulation; median

Fig. 81. *Gynaikothrips pedanus*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta


a
b
d
c

setae small. Pelta triangular, reticulate; a pair of campaniform sensilla present (Fig. 81d). Tergites III to IX with dark brown area medially, gradually increasing in intensity towards posterior tergites. Tergites II to VII each with 2 pairs of wing retaining setae; anterior pair slender, short, slightly curved; posterior pair stout, long, curved. B1 setae of tergite IX with pointed apices and shorter than tube. Tube dark brown and longer than head. Anal setae well developed.

Dimensions (holotype female; um) 2325.6. Head length 204, median width 210.8; eye length 88.4; postocular setae 49.3; antennal segments length: I 47.6; II 51; III 57.8; IV 54.4; V 57.8; VI 59.5; VII 50.2; VIII 34. Pronotum length 144.5, median width 326.4, major setae length: aa 45.9, am 27.2, ml 54.4, pa 66.3, ep 83.3. Tergite IX setae length: B1 158.1, B2 221, B3 200.6.

Type data. **Holotype** female, PHILIPPINES: Luzon: Gaggabutan Forest, Rizal, Cagayan, on Curran's Lipote rolled leaves, 29-III- 1977, L.C. Raros (**UPLB**).

Paratypes (8 females) same data as holotype (**UPLB**).

Male. Unknown.

Material examined. Type series only (**UPLB**).

Etymology. Pedanus is a Greek word meaning "short" in reference to head and maxillary stylets of these thrips.

Distribution (Fig. 84). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Gaggabutan Forest, Rizal, Cagayan.

Host. rolled leaves of Curran's Lipote

Gynaikothrips pontis*, *n.sp.
Holotype female, Philippines: Luzon: UPLB, Laguna (**UPLB**)
Figure 82a, b, c, d

Diagnosis. Body brown. Body setae pale. Head rectangular, reticulate with small warts. Eyes large, protruded. Postocular setae reduced. Antennal segment III with 1 outer sense cone; IV with 1 inner and 1 outer sense cones; III and IV subequal. Pronotal major setae with blunt apices; posteroangular setae reduced; epimeral setae well developed. Legs bicolored; foretarsi each with tooth. Forewings pale, with dark, median, longitudinal stripe and duplicated cilia. Pelta hat-shaped. B1 setae on tergite IX short and stout. Tube longer than head.

This species differs from *G. elegans* principally in having antennal segment III about as long as IV; cheek setae slender; pronotum without strong setae anteriorly and laterally except for anteroangulars; abdominal tergites II, VI and VII with 2 pairs of wing retaining setae, those on III to V with 4 pairs of such setae.

Female macroptera. Head rectangular, about 2.0 times as long as wide; widest at base; reticulate, with small warts (Fig. 82a). Ocellar hump small. Ocelli large; posterior ocelli touching inner margins of eyes. Eyes large, protruded. Postocular setae well developed, with blunt apices. Cheeks setae slender. Antennal segments III - VIII slender; segments I and II brown, II pale apically; III to VIII yellow; IV about as long as segment III; segment VIII constricted at base; segment III with 1 outer sense cone; IV with 1 inner and 1 outer sense cones (Fig. 82b). Maxillary stylets reaching level of postoculars, closed together near base of head. Mouthcone elongate, broadly rounded (Fig. 82a).

Pronotum with anastomosed striae; anteromarginal and midlateral setae small; anteroangular setae short but conspicuous; posteroangular setae reduced; epimeral setae developed, with blunt apices (Fig.82c). Femora brown; tibiae and tarsi yellow; foretarsi each with small tooth. Forewings pale, with dark, median longitudinal stripe, with 20 or more duplicated cilia. Meso and metanota reticulate.

Fig. 82. *Gynaikothrips pontis*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII

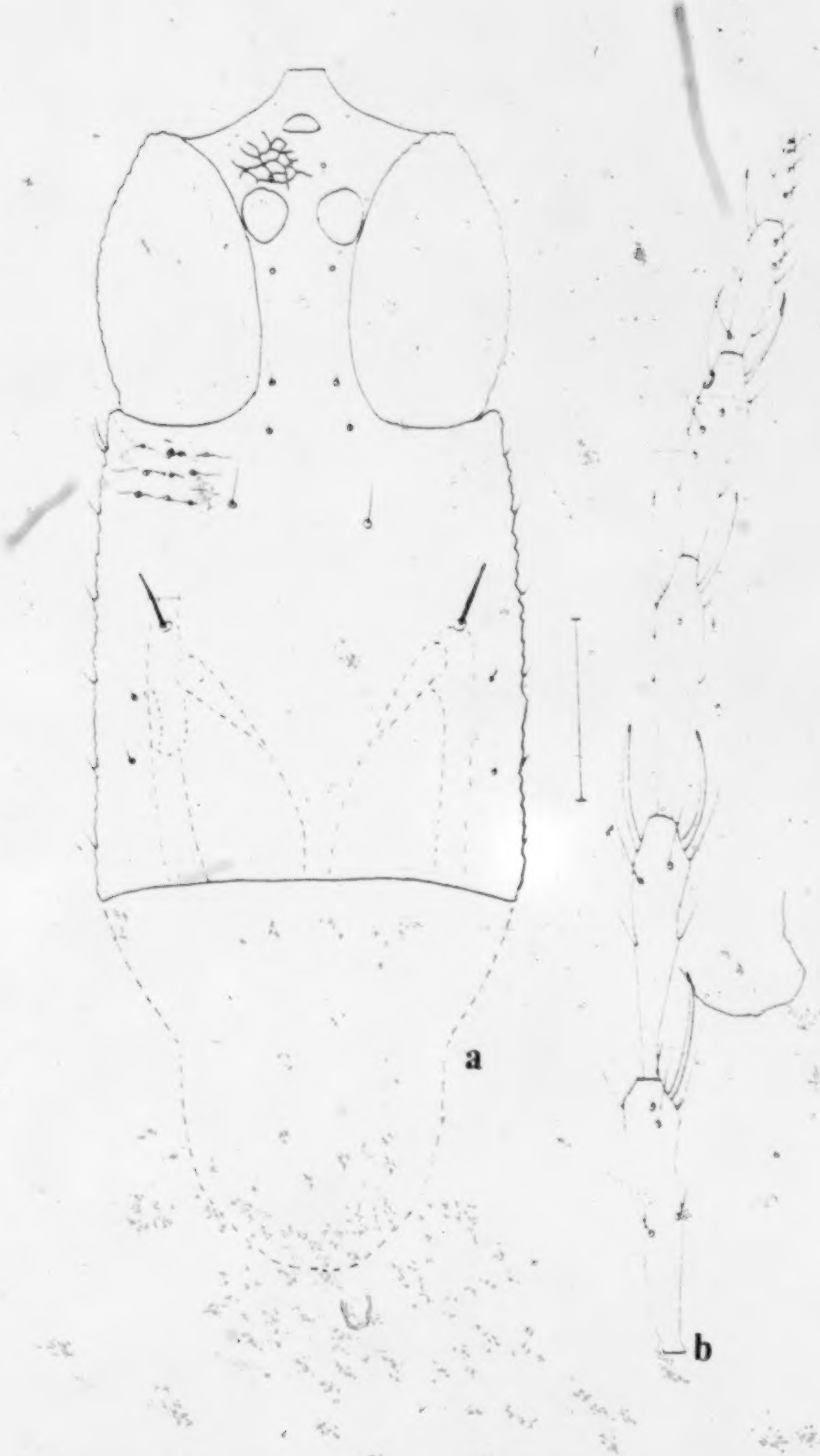
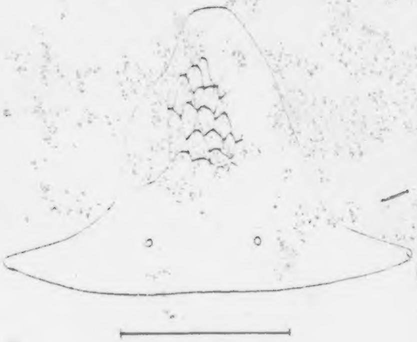

a
b

Fig. 82. *Gynaikothrips pontis*, n. sp., female holotype. c. Pronotum d. Pelta



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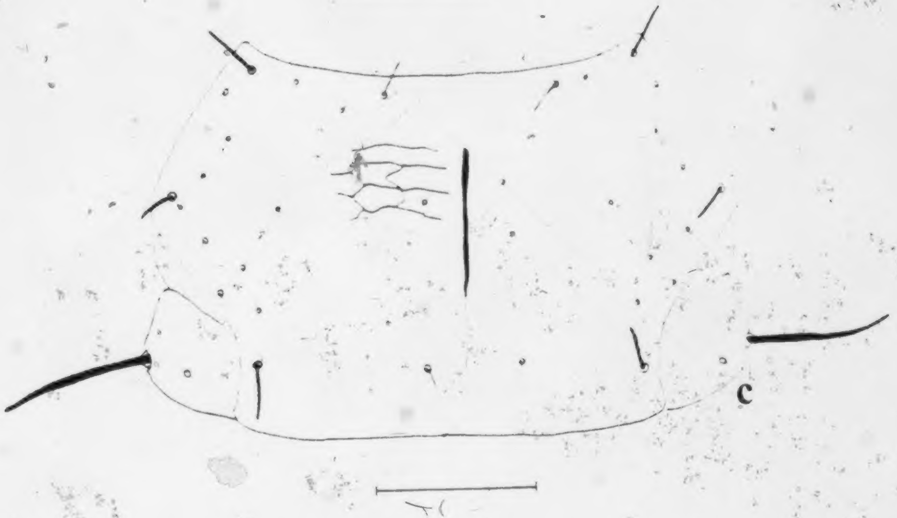


c

Pelta hat-shaped, reticulate; a pair of campaniform sensilla present (Fig. 82d). Abdominal tergites strongly reticulate, with warts; accessory setae numerous. Tergal lateral setae developed and pale with knobbed apices. Tergite II with 2 pairs of wing retaining setae; those on III to V 4 pairs, 2 pairs stout and longer; those on tergites VI and VII 2 pairs, slender and simple. B1 setae of tergite IX short and stout, about 0.20 times as long as tube, with knobbed apices . Tube longer than head. vith moderately long setae. Anal setae longer than B1 setae of tergite IX.

Dimensions (holotype female; um). Body length (extended) 4175.2. Head length 469.2, median width 234.6; dorsal eye length 153; postocular setae length 30.6; antennal segments length: I 61.2; II 68; III 146.2; IV 149.6; V 153; VI 115.6; VII 85; VIII 57.8. Pronotum length 251.6, median width 360.4 major setae : aa 40.8; am 17; ml 20.4; pa 20.4; ep 112.2. Tergite IX setae length: B1 132.6; B2 394.4; B3 207.4. Tube length: 591.6

Type data. **Holotype** female, PHILIPPINES: Luzon: UPLB, Laguna, on leaves of *Ficus pseudopalma*, I-1985, C. P. Reyes (**UPLB**). **Paratypes** (1 female, 1 male) same data as holotype (**UPLB**).

Male macroptera. Similar to female in color. Body smaller. Forewings with 15 duplicated cilia. Abdominal tergite VIII about 2 times as long as tergite IX.

Dimensions (allotype male; um). Body length (extended) 3366. Head length 420.2, median width 190.4; dorsal eye length 142.8; postocular setae length 27.2; antennal segments length: 57.8; II 64.6; III 132.6; IV 132.6; V 136; VI 98.6; VII 71.4; VIII 44.2. Pronotum length 197.2, median width 285.6, major setae: aa 27.2; am 10.2; ml 17; pa 20.4; ep 88.4. Tergite IX setae length: B1 88.4; B2 44.2; B3 25.5. Tube length: 442.

Material examined. Type series. Other. 1 male, Mindanao: Agko, Mt. Apo, 5-V-1987, host unknown, 5-V-1987, C.P.Reyes (**CPRC**); 1 male, Luzon: Los Banos, Laguna, in sweeping materials, 30-VII-1929, T. Ishii (**SMFG**).

Etymology. Pontis is a Latin word meaning "bridge" in reference to the characters these thrips possess which are intermediate to members of *Gynaikothrips* and *Gigantothrips*.

Distribution (Fig. 84). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: UPLB, Laguna; Los Banos, Laguna; Mindanao: Agko, Mt. Apo.

Hosts. *Ficus pseudopalma*, sweeping mater. The type material of this species were collected together with *G. elegans* on the undersurface of the leaves of *Ficus pseudopalma* in Los Banos.

Gynaikothrips xynos, **n.sp.**
Holotype female, Philippines: Visayas: VISCA, Baybay, Leyte (UPLB)
Figure 83a, b, c, d

Diagnosis. Body brown. Body setae pale. Head rectangular, reticulate and with small warts. Eyes large, protruded. Postocular setae well developed and with blunt apices. Antennal segment III longer than IV. Maxillary stylets short. Major pronotal setae with blunt apices; epimeral setae longer than posteroangulars. Legs bicolored; foretarsi each with tooth. Forewings pale, with dark, median longitudinal stripe and duplicated cilia. Pelta triangular. B1 setae on tergite IX slender, a little shorter than tube. Tube longer than head.

This species differ from *G. pontis*, n. sp. in having shorter maxillary stylets lying nearly parallel in the base of head; postocellar setae conspicuous; antennal segment IV shorter than III, and with 1 inner and 2 outer sense cones; pelta triangular, and B1 seta on tergite IX long and slender rather than stout.

Female macroptera. Head rectangular, about 2.0 times as long as wide, widest at base; reticulate, with small warts (Fig. 83a). Ocellar hump small. Ocelli large; posterior ocelli touching inner margins of eyes. Postocellar setae well developed. Eyes large, protruded. Postocular setae shorter than length of eyes, with blunt apices. Cheek setae slender. Antennal segments I and II brown, II with pale base; III to VIII elongate, brown; III longer than IV and with outer sense cone; segment IV with 1 inner and 2 outer sense cones (Fig. 83b). Maxillary stylets short, nearly parallel at base of head. Mouthcone broadly rounded (Fig. 83a).

Pronotum reticulate; major setae with blunt apices; anteroangular setae longer than anteromarginals; midlateral setae longer than anteroangulars; epimeral setae longer than posteroangulars (Fig. 83c). Femora brown; foretibiae yellow; mid and hindtibiae brown on basal third, yellow on apical two-thirds; tarsi yellow; foretarsi each with small tooth.

Fig. 83. *Gynaikothrips xynos*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII

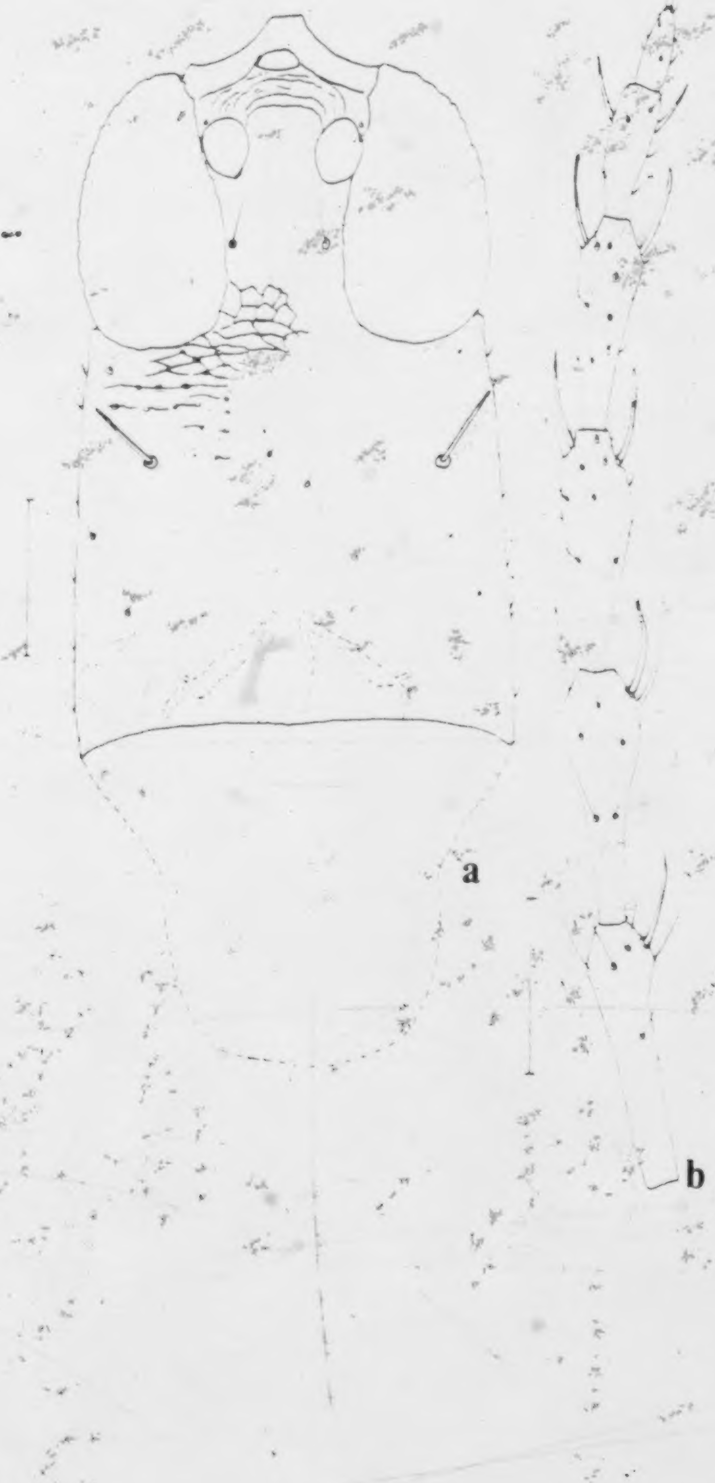
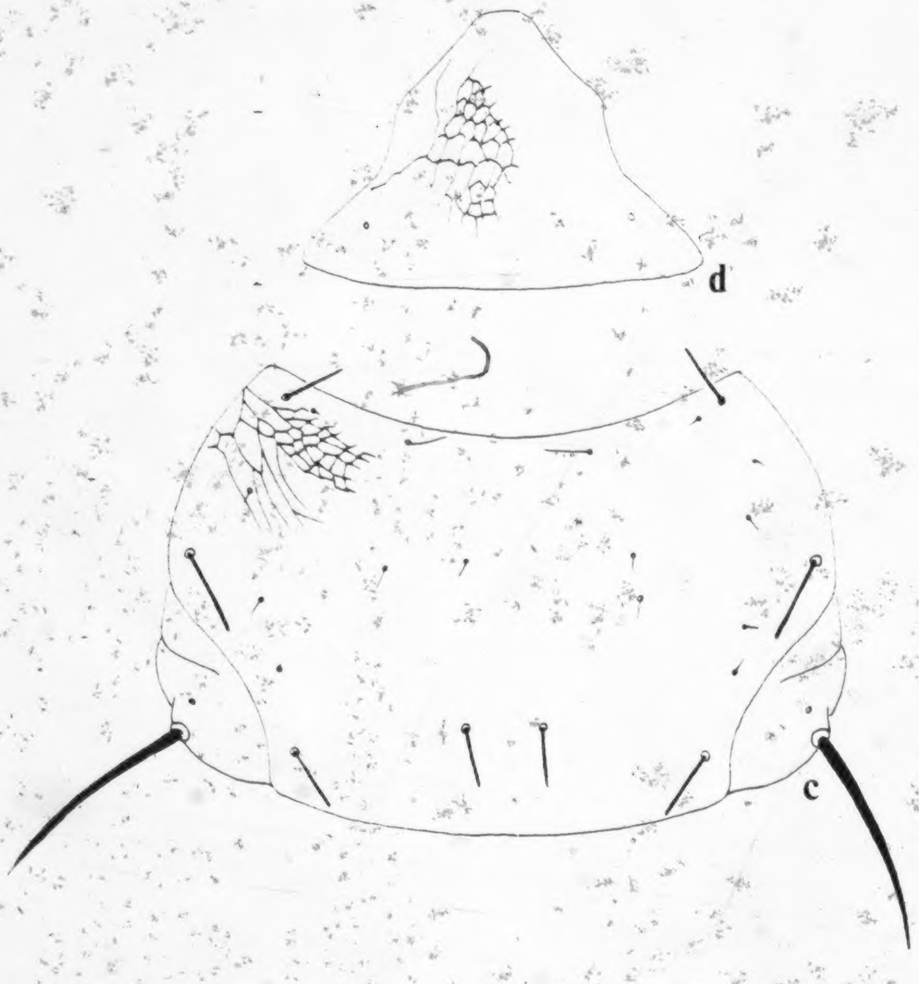

a
b

Fig. 83. *Gynaikothrips xynos*, n. sp., female holotype. c. Pronotum d. Pelta


d
c

Forewings pale, with dark, median, longitudinal stripe, with 30 duplicated cilia; subbasal wing setae developed, with blunt apices. Meso and metanota reticulate.

Pelta triangular, reticulate; campaniform sensilla absent (Fig. 83d). Abdominal tergites with strong warty reticulation laterally; accessory setae numerous. Tergite II with 2 pairs of wing retaining setae, those on tergites III to V 4 pairs, tergites VI and VII with 2 pairs, that are slender and simple. B1 setae on tergite IX slender, about 0.75 times as long as tube and with pointed apices. Tube longer than head, with fine setae. Anal setae well developed.

Dimensions (holotype female; um). Body length (extended) 3916.8. Head length 455.6, median width 244.8; dorsal eye length 137.7; postocular setae length 54.4; antennal segments length: I 54.4; II 79.9; III 149.6; IV 142.8; V 141.1; VI 122.4; VII 81.6; VIII 56.1. Pronotum length 312.8, width 414.8, major setae: aa 39.1, am 34, ml 42.5, pa 39.1, ep 136. Tergite IX setae: B1 455.6, B2 482.8, B3 353.6. Tube length: 537.2.

Type data. **Holotype** female, PHILIPPINES: Visayas: VISCA, Baybay, Leyte, on *Euphorbia hirta*, 14-VI-1984, C. P. Reyes (**CPRC**); Paratypes (2 females), same data as holotype (**CPRC**).

Male. Unknown.

Material examined. Type series; 1 female, Mt. Makiling, host unknown, 2-II-1984, D. Concepcion; 4 females, UPLB, Laguna, on *Ficus* sp., 2-III-1985, Oratai and Chantana (**CPRC**).

Etymology. Xynos is a Greek word meaning "common" in reference to many accessory and wing retaining setae on intermediate tergites of these thrips which are rather common in larger thrips in the genus.

Distribution (Fig. 84). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Luzon and Visayas. PHILIPPINES: Luzon: UPLB, Laguna; Mt. Makiling; Visayas: VISCA, Baybay, Leyte.

Hosts. *Euphorbia hirta*., *Ficus* sp.

Gynaikothrips uzeli (Zimmermann)

Gynaikothrips uzeli Zimmermann, 1900: 12.
Holotype female, Indonesia: Buitenzorg, Java (**SMFG**)[examined]

Diagnosis. Body brown. Body setae pale. Head rectangular, surface reticulate and with or without small warts. Postocular setae reduced, shorter than length of eyes. Antennal segment III slightly longer and more slender than IV; segment III yellow; IV-VI yellow with brown apices; VII brown with pale base; VIII brown. Pronotal epimeral setae longest among major setae; anteromarginal setae minute. Legs generally brown, with pale apices. Forewings pale with duplicated cilia. Pelta triangular. Abdominal tergites II to VII each with 2 pairs of wing retaining setae. Tube longer than head.

Adults of *G. uzeli* are difficult to differentiate from those of *G. ficorum* which are also common on *Ficus* spp. and have a cosmopolitan distribution.

Female macroptera. Head longer than wide, slightly constricted behind eyes; surface finely reticulate, with or without small warts. Ocellar hump prominent; ocelli large. Eyes about one-third of head length, bulged. Postocular setae shorter than dorsal length of eyes, sometimes 2 pairs. Cheek setae sparse. Antennal segments 1 and II brown but apex of II pale; III to VIII yellow; segment III longer and more slender than IV; VIII broad at base. Maxillary stylets not retracted to level of postocular setae. Mouthcone broadly rounded.

Pronotum reticulate; major setae reduced, with knobbed apices; anteromarginal setae minute; anteroangular and midlateral setae conspicuous; posteroangular setae reduced; epimeral setae developed. Femora brown; foretibia yellow, shaded with brown apically; mid and hindtibiae brown in basal two thirds, yellow in apical third; tarsi yellow; foretarsi with or without small tooth. Forewings pale, each with 10 to 21 duplicated cilia; subbasal wing setae developed, with knobbed apices. Meso and metanota reticulate.

Pelta triangular, reticulate with raised sculpture medially; pair of campaniform sensilla present. Abdominal tergites with small warts and strong lateral reticulation; several lateral accessory setae of tergites. Tergite II to VII each with 2 pairs of wing retaining setae. B1 setae of tergite IX slender, shorter than tube. Tube a little shorter or longer than head, with minute lateral setae. Anal setae well developed.

Male macroptera. Similar to female in general structure and color but body smaller and more slender. Foretarsal tooth stronger than in female.

Material examined. 2 females, 1 male, Los Banos, Laguna, on curled leaves of *Ficus* sp., 28-VI-1987, C. P. Reyes; 1 female, Mudspring, Mt.Makiling, 27-VI-1987, on Lauraceae, C. P. Reyes (**CPRC**).

Distribution (Fig. 84). The known range of this species extends from India eastward in the Indonesia Archipelago. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: Manila. INDONESIA: Java. MALAY ARCHIPELAGO. SINGAPORE. VIETNAM. INDIA. GUAM.

Hosts. *Ficus* spp., young top and galled leaves of *Ficus benjamina*, galled leaves of *Ficus retusa*, *Ficus obtusa*, *Ficus pilosa*, small leaved species of *Ficus* sp., *Macaranga* sp., *Ficus microcarpa*, *Ficus superba* . This species was badly damaging the leaves of *Ficus retusa* (Karny, 1927) and is one of the common species of *Gynaikothrips* producing leaf folds on *Ficus benjamina* in India (Ananthakrishnan and Ramamuthi, 1966).

Fig. 84. Distribtuion of *Gynaikothrips* species in the Philippines, and world.

● *G. capitulatus*, n. sp.

● *G. elegans* Zimmermann

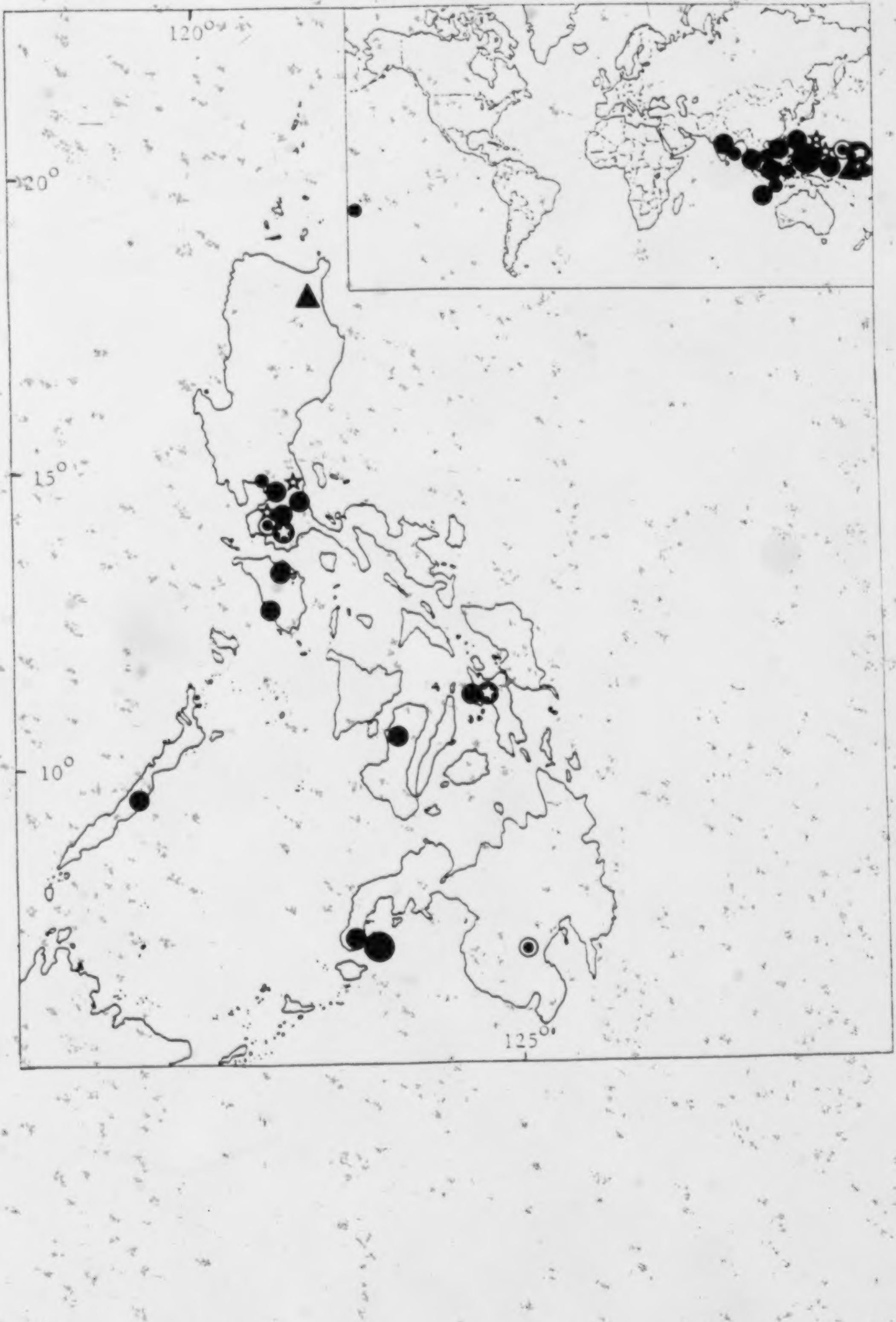
☆ *G. luzonensis* Priesner

▲ *G. pedanus*, n. sp.

◉ *G. pontis*, n. sp.

✪ *G. xynos*, n. sp.

• *G. uzeli* Zimmermann


120°
20°
15°
10°
125°

Genus *Haplothrips* Amyot & Serville

Haplothrips Amyot & Serville, 1843: 640.
Type species: *Phloeothrips albipennis* Burmeister, a synonym of *Thrips aculeata* Fabricius, by monotypy.

Diagnosis. Head gradually narrowed towards base; weakly striate or smooth. Eyes moderate in size, sometimes considerably prolonged posteriorly on ventral surface of head. Postocular setae pointed, blunt or expanded. Antennae 8- segmented; segment III small, with at most 2 sense cones; segment IV with 4 or 5 sense cones. Maxillary stylets long, retracted far into head; maxillary bridge present. Mouthcone broadly rounded to pointed.

Pronotal anteromarginal and midlateral setae vestigial to developed. Praepectal plates present, developed; mesopraesternum somewhat degenerate. Foretarsi each with or without small tooth. Usually macropterous; forewings constricted in middle, and with or without duplicated cilia.

Pelta small, generally triangular. Abdominal tergites III-VII each with 2 pairs, or in few taxa 1 pair, of well developed, wing retaining setae. Males with glandular area on abdominal sternite VIII. Anal setae variable, sometimes more than 2 times as long as tube.

Adults of *Haplothrips* are medium-sized thrips with no especially developed peculiarities, and are usually brown, or rarely yellow or bicolored. Praepectal plates are present. Forewings are constricted in the middle, and often the third antennal segment is small. Members of some species are known to be predaceous on other small arthropods while those of others are host specific on various plants. This large genus includes more than 200 known species, distributed throughout the world (Mound and Houston, 1987). Due to the problems of species recognition in this genus, I am reporting only 4 species from the Philippines. More than 1,500 specimens in my collection require additional study before their identities and relationships can be resolved.

Key to presently resolved Philippine species of *Haplothrips* Amyot and Serville

1 Forewings without duplicated cilia; postocular setae minute; pronotal posteroangular setae prominent .... *H. euphorbiae* Priesner

1' Forewings with duplicated cilia; postocular setae well developed; major setae of pronotum developed 2

2(1') Maxillary stylets reaching level of postoculars; antennal segments III to VI yellowish .... *H. chinensis* Priesner

2' Maxillary stylets not reaching level of postoculars; antennal segments III to V yellowish brown to yellow 3

3(2') Antennal segments III and IV with 1 and 5 sense cones respectively; tarsi brownish .... *H. gowdeyi* (Franklin)

3' Antennal segments III and IV with 2 and 5 sense cones respectively; tarsi yellowish .... *H. ganglbaueri* Schmutz

Haplothrips chinensis **Priesner**
Haplothrips chinensis Priesner, 1933a: 359.
Holotype female, Taiwan (**SMFG**)[examined]

Diagnosis. Body brown. Body setae pale. Head longer than wide. Postocular setae developed, with rounded apices. Antennal segments III and IV with 2 and 5 sense cones respectively. Pronotal major setae developed, with rounded apices. Legs generally brown. forewings pale, with duplicated cilia. Pelta triangular. Tube shorter than head.

This is the first record of *H. chinensis* in the Philippines. Adults of this species differ from those of *H. gowdeyi* and *H. ganglbaueri* in having maxillary stylets reaching the level of the postocular setae, and antennal segments III to VI yellowish.

Female macroptera. Head longer than wide, with transverse striae. Ocelli large. Postocular setae developed, with rounded apices. Antennal segments I and II brown, II pale apically; III to VI yellow; VII to VIII brownish; segment III and IV with 2 and 5 sense cones respectively. Mouthcone rounded.

Pronotal major setae developed, rounded apically; anteroangular setae about as long as anteromarginals; epimeral setae slightly longer than posteroangulars. Legs generally brown; foretibiae brown with yellowish apices; tarsi light brown. Forewings pale, each with 7 to 8 duplicated cilia; subbasal wing setae developed; S1 and S2 setae knobbed apically; setae S3 pointed apically and longest. Meso and metanota weakly reticulate.

Pelta triangular, with pair of campaniform sensilla. Tergites II to VII each with 2 pairs of wing retaining setae; B1 setae of tergites developed, with rounded apices. B1 setae of tergite IX with pointed apices and longer than tube. Tube conical, shorter than head. Anal setae about as long as tube.

Male macroptera. Similar to female in general structure and color but body smaller and more slender. Not yet known in the Philippines.

Material examined. 1 female, Bontod [?Bacolod], Negros Occidental, unknown (**CASC**); 1 female, Manila, taken in quarantine at Seattle and Guam, on cut flowers (**USNM**).

Distribution (Fig. 85). The known range of this species extends from Japan to Taiwan and the Philippine Archipelago and northward to Tobago. In the Philippines, this species is known from the islands of Luzon and Visayas. PHILIPPINES: Luzon: Manila, taken in quarantine at Seattle and Guam; Visayas: Negros Occidental. TAIWAN. JAPAN. TOBAGO.

Hosts. cut flowers, on numerous plants

Haplothrips euphorbiae Priesner
Haplothrips (?) *euphorbiae* Priesner, 1931: 1-4. Female.
Holotype female, Indonesia: Medan, Sumatra (**SMFG**) [examined]

Diagnosis. Body brown. Body setae pale. Head about as long as wide or slightly longer. Postocular setae reduced. Antennal segments III and IV similar in shape, with 2 and 5 sense cones respectively. Pronotal anteromarginal and midlateral setae vestigial. Legs generally brown. Forewings pale, without duplicated cilia. Pelta triangular. Tube shorter than head.

This is the first record of *H. euphorbiae* in the Philippines. Adults of this species differ from those of other known haplothripines in the Philippines in not having duplicated cilia in the forewings.

Female macroptera. Head about as long as wide or slightly longer with transverse striae. Ocelli large. Postocular setae reduced with blunt apices. Antennal segments I and II brown, II pale at apex; III yellow; IV to VI yellowish brown, gradually darkened towards apices; VII and VIII brown; segments III and IV similar in shape, with 2 and 5 sense cones respectively; segment VIII elongate. Maxillary stylets retracted to level of postocular setae. Mouthcone rounded.

Pronotal anteromarginal and midlateral setae vestigial; epimeral setae conspicuous, expanded apically. Legs generally brown except foretibiae and foretarsi greyish yellow. Forewings pale, without duplicated cilia; subbasal wing setae short, widely expanded apically. Mesonotum with transverse, anastomosed striae. Metascutum with longitudinal anastomosed striae; median setae developed.

Pelta triangular, with pair of campaniform sensilla. Abdominal tergites II to VII each with 2 pairs of wing retaining setae. B1 setae of tergite IX pale, expanded apically, shorter than tube. Tube conical, shorter than head. Anal setae developed.

Male. ?Unknown.

Material examined. 1 male, VISCA, Baybay, Leyte, on *Euphorbia hirta*, 22-V-1984, S. G. Reyes; 4 females, VISCA, Baybay. Leyte, on *Euphorbia hirta*, 14-VI-1984, C. P. Reyes (**CPRC**).

Distribution (Fig. 85). The known range of this species extends from India to the Indonesian Archipelago. In the Philippine Archipelago, this species is known from the island of Visayas. PHILIPPINES: Visayas: VISCA, Baybay, Leyte. INDONESIA: Medan, Sumatra. INDIA.

Hosts. *Euphorbia hirta*, galls of *Euphorbia hirta*, flowers of *Euphorbia sp.*, grass

Haplothrips ganglbaueri Schmutz
Haplothrips ganglbaueri, Schmutz, 1913: 1034.
Holotype female, Sri Lanka: Peradenya (**unknown**)[not examined]
Haplothrips ganglbaueri Schmutz; Pitkin, 1976: 249-250.

Diagnosis. Body brown. Body setae pale. Head longer than wide. Postocular setae developed, with expanded apices. Antennal segments III and IV with 1 and 5 sense cones respectively. Pronotal major setae developed, with expanded apices. Legs bicolored. Forewings pale, with duplicated cilia. Pelta triangular. Tube shorter than head.

Adults of this species differ from those of *H. gowdeyi* in having 2 sense cones on antennal segment III, and all tarsi yellow. Adults and immatures of *H. ganglbaueri* were collected on many plants from the Philippines. Females of this species are difficult to distinguish from those of *H. bagrollis* Bhatti (Pitkin, 1976).

Female macroptera. Head longer than wide, with transverse striae. Ocelli large. Postocular setae developed and expanded apically. Cheeks almost parallel-sided. Antennal segments I and II brown, III brownish yellow; IV to VI brown, gradually darkened towards posterior segments; segments III and IV with 1 and 5 sense cones respectively. Maxillary stylets not retracted to level of postocular setae. Mouthcone rounded.

Pronotal major setae well developed, expanded apically; epimeral setae longest. Femora brown; foretibiae yellow with brownish lateral margins; mid and hindtibiae brown; tarsi yellow. Forewings pale, each with 5 to 8 duplicated cilia; subbasal wing setae well developed, expanded apically, setae S3 longest. Meso and metanota weakly reticulate.

Pelta triangular, with pair of campaniform sensilla. Abdominal tergites II to VII with 2 pairs of wing retaining setae. B1 setae of tergite IX blunt to slightly expanded apically; shorter than tube. Tube conical, shorter than head. Anal setae well developed.

Male macroptera. Similar to female in color and structure but smaller.

Material examined. 1 female, Alicia Isabela, on rice seedling, 26-V-1972, A. D. Pawar; 1 female, IRRI, Los Banos, Laguna, on rice panicle, 20-XII-1971, A. D. Pawar

(**TMNH**); 1 female, Los Banos, Laguna, on grass, 22-VII-1931, I. D. Dobrosky; 1 female, on leaves of pink flowering cotton, 9-VII-1931, I. d. Dobrosky; 3 females, 1 male, Bacolod, Negros Occidental, on *Kyllingia brevifolia*, 24-IX-1928, W. D. Pierce; 1 female, Hacienda Magsaysay, Bacolod, Negros Occidental, on rice field, 22-IX-1928, W. D. Pierce; 1 female, Concepcion, Cadiz, Negros Occidental, on flowers of "Quigar", 16-V-1928, W. D. Pierce; 2 males, Kanituin, Bago, Negros Occidental, on *Hyptis brevipes*, 12-IV-1928, W. D. Pierce; 1 female, Victorias, Negros Occidental, on sugarcane flowers, 22-XI-1929, W. D. Pierce (**CASC**); 1 female, 1 male, IRRI, Los Banos, Laguna, on *Oryza sativa*, 6-X-1983, C. P. Reyes; 1 female, 1 male, on *Borrerea* sp., 4-X-1983, C. P. Reyes; 1 female, UPLB, Laguna, on *Helianthus* sp., 12-III-1985, Oratai and Chantana; 7 females, 3 males, on *Helianthus annuus*, 12-III-1985, Oratai and Chantana; 1 male, on *Vigna sinensis*, 5-X-1983, C. P. Reyes; 1 female, 1 male, Rainforest, Mt. Makiling, Laguna, on grass, 27-VI-1987, C. P. Reyes; 5 females, 2 males, Mudspring, Mt. Makiling, Laguna, on grass, 27-VI-1987, C. P. Reyes; 1 female, Pantabangan, Nueva Ecija, on *Imperata cylindrica*, 7-IX-1976, L. C. Raros; 1 female, Wright Park, Baguio City, host unknown, 8-XII-1984, C. P. Reyes; 1 female, 1 male, Mt. Mayon resthouse, Albay, on sweeping grass, 6-VI-1987, C. P. Reyes; 1 female, 1 male, on flower of *Cosmos* sp., 6-VI-1987, 1 female, Albay, on leaf of unknown plant, 5-VI-1987, C. P. Reyes; 2 females, Hiwacloy, Goa, Camarines Sur, on "taratabacco", 3-VI-1987, C. P. Reyes; 1 female, on flower of unknown plant, 3-VI-1987, C. P. Reyes; 4 females, 3 males, Bicol Expt. Sta., Pili, Camarines Sur, on *Saccharum spontaneum*, 5-VI-1987, C. P. Reyes; 1 female, Mt. Tabiey, Cabigaan, Palawan, on leaf shoot of *Baringtonia*, 23-V-1987, V. Fernando; 1 female, Maasin, Brooks Point, Palawan, on *Tagetes erecta*, 30-I-1985, C. P. Reyes; 1 female, 1 male, Brooks Point, Palawan, on *Polygonum barbatum*, 30-I-1985, C. P. Reyes; 3 females, Cabar, Brooks Point, Palawan, on *Cyrtococum accrescens*, 31-I-1985, C. P. Reyes; 5 females, 2 males, VISCA, Baybay, Leyte, on Graminae, 13-V-1987, C. P. Reyes; 2 females, 3 males, on leaves of Palmae, 13-V-1987,

C. P. Reyes; 3 females, 3 males, on unknown vine, 12-V-1987, C. P. Reyes; 2 males, on yellow alder, 13-V-1987, C. P. Reyes; 2 females, 1 male, on *Musa* sp., 13-V-1987, C. P. Reyes; 4 females, on *Saccharum spontaneum*, 13-V-1987, C. P. Reyes; 1 male, on *Saccharum officinarum*, 13-V-1987, C. P. Reyes; 5 females, on tassel of *Zea mays*, 12-V-1987, C. P. Reyes; 3 females, on *Zea mays*, 5-V-1983, C. P. Reyes; 3 males, on *Cyperus* sp. and on *Chloris* sp., on grass, 12-V-1987, C. P. Reyes; 2 females, on *Cryptococcum* sp., and on arrow root plant, leaf of croton, 13-V-1987, C. P. Reyes; 3 females, on grass, on *Ipomoea aquatica*, on *Stachytarpheta* sp., 12-V-1987, C. P. Reyes; 4 females, on *Echinocloa colona*, 11-VI-1984, C. P. Reyes; 1 female, Mt. Pangasugan, Leyte, on flower of unknown plant, 4-V-1983, C. P. Reyes; 2 females, Sipit Saburan, Puerto Gallera, on *Bambusa* sp., 20-IV-1987, C. P. Reyes; 1 female, on unknown vine, 19-VI-1987, C. P. Reyes; 2 males, on "balanoy" and on *Manihot* sp., 20-VI-1987, C. P. Reyes; 1 male, on *Panicum* sp. flower, 19-VI-1987, C. P. Reyes; 4 females, 2 males, Jaro, Iloilo, on *Dendrobium*, 14-III-1985, C. P. Reyes; 3 females, 1 male, Pina, Guimaras, on unknown grass, 22-V-1987, C. P. Reyes; 1 male, Guimaras Expt. Sta., on *Rosa* sp., 21-VI-1987, C. P. Reyes; 1 male, La Granja, La Carlota, Negros Occidental, host unknown, 16-V-1985, C. P. Reyes; 1 male, on sweeping grass, 26-V-1987, C. P. Reyes; 1 female, on *Panicum maximum*, 16-V-1985, C. P. Reyes; 1 male, Victorias, Negros Occidental, on *Ipomoea triloba*, 26-V-1987; 3 females, La Granja, La Carlota, on *Cajanus cajan*, 26-V-1987, C. P. Reyes; 1 female, 1 male, Pagadian City, on silk of *Zea mays*, VII-1985, E. Decena; 3 females, 4 males, Anuling, Pamocotan, Zamboanga, on *Celosia crestata*, 11-VII-1987, C. P. Reyes; 3 males, Bago-Oshiro, Davao City, on *Mirabilis jalapa*, 4-III-1985, C. P. Reyes; 8 females, 4 males, on leaf sheath of *Zea mays*, 2-III-1985, C. P. Reyes; 4 females, 3 males, Malungon, South Cotabato, on *Borreria laevis*, host unknown, 23-II-1985, C. P. Reyes; 2 females, Mlang, North Cotabato, host unknown, 13 and 16-V-1987, C. P. Reyes; 2 males, on "alibhon", host unknown, 17 and 18-II-1985, C. P. Reyes; 2 females, 1 male, Sagpangan, Agko, Mt. apo, on flower of everlasting, on flower of *Coffea* *arabica*, on sweeping grass, 5-V-1987, C. P. Reyes; 3 females, on *Calocasia* sp., 5-V-1987, C. P. Reyes; 2 females, 1 male, tassel of *Zea mays*, 5-V-1987, C. P. Reyes; 2 females, Agko, Mt. apo, on ear of *Zea mays*, unknown, 4-V-1987, 16-IV-1983, C. P. Reyes; 1 female, on sweeping fern, 5-V-1987, C. P. Reyes; 7 females, 1 male, on flower of "aguingay", 4-V-1987, C. P. Reyes; 4 females, 2 males, on sweep of grass, 5-V-1987, C. P. Reyes; 4 females, 2 males, on leaves of *Saccharum* sp., 4-V-1987, C. P. Reyes; 1 female, 1 male, flower of unknown plant, 5-V-1987, C. P. Reyes; 1 female, Ilomavis, Kidapawan, North Cotabato, on *Panicum* sp., 5-V-1987, C. P. Reyes (**CPRC**); 5 females, Bo. 7, Koronadal, South Cotabato, on seedlings of *Zea mays*, 4-VI-1985, A. Barrion (**IRRI**).

Distribution (Fig. 85). The known range of this species extends from Algeria eastward through the Middle East to India, in the Philippine Islands to the Indonesian Archipelago. In the Philippine Archipelago, this species is known from the four principal zoogeographic regions, on the islands of Luzon, Palawan, Visayas and Mindanao. PHILIPPINES: Luzon; Palawan; Visayas; Mindanao. INDONESIA: Java; Sumatra; Krakatua. PAKISTAN. BANGLADESH. INDIA. TAIWAN. SRI LANKA. SAUDI ARABIA. YEMEN. SUDAN. LIBYA. ALGERIA. MOROCCO. EGYPT. SOLOMON Is.

Hosts. on numerous plants

Haplothrips gowdeyi (Franklin)
Anthothrips gowdeyi Franklin, 1908: 724.
Holotype female, Barbados (**USNM**)[examined]

Diagnosis. Body brown. Body setae pale. Head longer than wide. Postocular setae well developed, expanded at apex. Antennal segments III and IV with 2 and 5 sense cones respectively. Pronotal major setae developed, with expanded apices. Legs generally brown. Forewings pale, with duplicated cilia. Pelta triangular. Tube shorter than head.

This is the first record of *H. gowdeyi* in the Philippines. Adults of this species principally differ from those of *H. ganglbaueri* in having 1 sense cone in antennal segment III and all tarsi brown.

Female macroptera. Head longer than wide, with transverse striae. Ocelli large. Postocular setae developed and expanded apically. Cheeks almost parallel-sided. Antennal segments I and II brown; III to V yellow; VI yellowish brown; VII and VIII brown; segment HI and IV with 2 and 5 sense cones respectively. Mouthcone rounded.

Pronotal major setae developed, expanded apically; anteroangular and anteromarginal setae about as long as midlaterals; epimeral setae about as long as posteroangulars. Legs brown, tarsi pale brown; foretarsi each with small tooth. Forewings pale, each with 4 to 9 duplicated cilia; subbasal wing setae developed, expanded apically.

Pelta triangular, with a pair of campaniform sensilla. Abdominal tergites II to VII each with 2 pairs of wing retaining setae. B1 setae of tergite IX about as long as tube, with pointed apices. Tube conical, shorter than head. Anal setae developed.

Male macroptera. Similar to female in general structure. Body light brown and smaller.

Material examined. 1 female, Cadiz, Negros Occidental, on *Amaranthus viridis*, 22-V-1928, W. D. Pierce; 2 females, 22-II-1928, on *Lantana camara*, W. D. Pierce; 1 female, Victorias, Negros Occidental, on "dalopang", 28-IX-1927, W. D. Pierce; 3 females, 1 male, Hacienda San Antonio, Victorias, Negros Occidental, on *Scleria* sp., 27-III-1929, W. D. Pierce (CASC); 3 females, IRRI. Los Banos, Laguna, on flower of *Wedelia triloba*, 4-X-1983, C. P. Reyes; 3 females, on *Borrerea* sp., 4-X-1983, C. P. Reyes; 3 females, Mudspring, Mt. Makiling, host unknown, 27-VI-1987, C. P. Reyes; 3 females, UPLB, Laguna, on *Cromolina odorata, Celosia argentia* and *Helianthus annuus*, 12-III-1985 and 5-V-1983; C. P. Reyes; 4 females, on leguminous plant, and unknown weed, 2-III-1985, and 12-III-1985, Oratai and Chantana; 1 female, host unknown, X-1984, R. Badiang; 1 female, Bo. Manggahan, Dolores, on grass, 4-III-1987, C. P. Reyes; 2 females, San Rafael, Castilla, Sorsogon, on flower of Margarita, 6-VI-1987, C. P. Reyes; 8 females, 2 males, Bicol Expt. Sta., Pili, Camarines Sur, on *Mimosa pudica*, 5-VI-1987, C. P. Reyes; 2 females, Mt. Mayon resthouse, Albay, on sweeping grass, 6-VI-1987, C. P. Reyes; 1 female, Hiwacloy, Goa, Camarines Sur, on "taratabacco" 3-VI-1987, C. P. Reyes; 4 females, on *Ageratum* and host unknown, 3-VI-1987, C. P. Reyes; 1 female, on *Solanum* sp., 18-V-1977, C. P. Reyes; 2 females, Bicol Expt. Sta., Camarines Sur, on flower of unknown plant, 5-VI-1987, C. P. Reyes; 2 females, San Pedro, Batac, Ilocos Norte, on *Solanum tuberosum*, 9-IV-1985, C. P. Reyes; 8 females, MSAC, La Trinidad, Mt. Province, on strawberry, 8-XII-1984, C. P. Reyes; 4 females, Wright Park, Baguio City, host unknown, 8-XII-1984, C. P. Reyes; 3 females, 1 male, on *Cyperus compactus*; 3 females, 1 male, on *Apluda mutica*, 1 male, on flower of *Kudzu*, Pagasa, Tagdidili, Maasin, Brooks Point, Palawan, 30-I-1985, C. P. Reyes; 1 female, Sagpangan, Palawan, on leaf sheath of unknown plant, 24-V-1987, C. P. Reyes; 1 female, Sipit Saburan, Puerto Gallera, on *Artocarpus* sp., 20-VI-1987, C. P. Reyes; 3 females, Villaflor, Puerto Gallera, on *Gomphrina* sp., 22-VI-1987, C. P. Reyes; 1 female, on flower of *Glericidea*, 1 female, on *Stachytarpheta* sp., 1 female, on flower of *Chloris* sp., 12-V-1987 and 1 female, on *Vernonia* sp., 13-V-1987, VISCA, Baybay, Leyte, C. P. Reyes; 2 females, on sweeping grass and 1 female, on *Vigna sinensis* and 2 females, on unknown grass, La Granja, La Carlota, Negros Occidental, 26-V-1987, C. P. Reyes; 4 females, host unknown, 16-V-

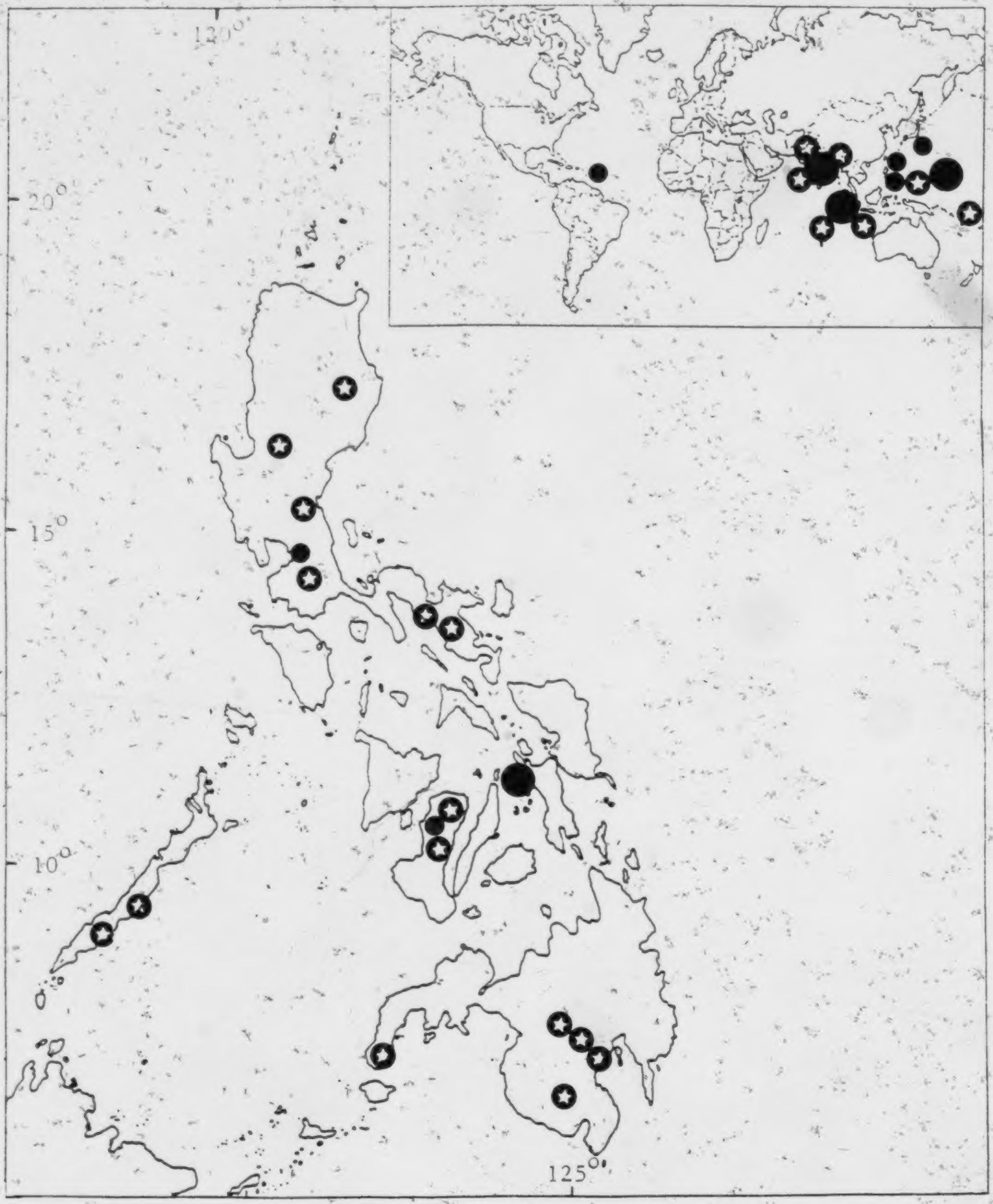
1985, C. P. Reyes; 4 females, Salamangca, La Carlota, Negros Occidental, on sweep under coffee, 8-III-1987, C. P. Reyes; 1 female, on *Commelina benghalensis* and 2 females, on *Elephantopus mollis* and 1 female, on *Borrerea laevis*, Gabok, Canlaon, Negros Occidental, 12-V-1985, C. P. Reyes; 1 female, Mt. Kitanglad, Bukidnon, on *Aster* sp., 27-V-1984, S. G. Reyes; 3 females, BPI, Davao City, on flowers of unknown plant, 16-IV-1983, S. G. Reyes; 3 females, host unknown, 31-V-1984, S. G. Reyes; 1 male, Tugbok, Davao City, on flower of *Portulaca* sp., 4-III-1985, C. P. Reyes; 3 females, on *Imperata cylindrica*, 1 female, on *Panicum* sp., Ilomavis, Kidapawan, North Cotabato, 5-V-1987, C. P. Reyes; 1 female, Sagpangan, Agko, Mt. Apo, on unknown leaves, 5-V-1987, C. P. Reyes; 1 female, on flower of *Saccharum* sp., 1 female, on ear of *Zea mays*, 4-V-1987, C. P. Reyes; 5 females, on "million flower", 5-V-1987, C. P. Reyes; 1 female, USM, Kabacan, North Cotabato, on *Saccharum spontaneum*, 18-II-1985, C. P. Reyes; 1 female, Mlang, North Cotabato, host unknown, 16-V-1987, C. P. Reyes; 1 female, on *Elephantopus tomentosus*, 18-II-1985, C. P. Reyes; 1 female, on *Chromolaena odorata*, 17-II-1985, C. P. Reyes; 4 females, Malandag, Malungon, South Cotabato, on *Heliotropium indicum*, 25-II-1985, C. P. Reyes; 1 female, on *Alysicarpus vaginalis* and 1 female, on *Hyptis suaveolens* and 1 female, host unknown and 1 female, on *Tridax procumbens* and 1 female, on "taglinao", Malungon, South Cotabato, 23-II-1985, C. P. Reyes; 2 females, on *Borrerea laevis*, 23-II-1985, C. P. Reyes; 3 females, 1 male, on *Ageratum conyzoides*, 23-II-1985, C. P. Reyes; 1 female, on *Stachytarpheta* sp., 24-II-1985, C. P. Reyes (**CPRC**).

Distribution. This species has a cosmopolitan distribution. In the Philippines, this species is known from the four principal zoogeographic regions, on the islands of Luzon, Palawan, Visayas and Mindanao. PHILIPPINES: Luzon; Palawan; Visayas; Mindanao.

Hosts. on flowers of numerous plants. *H. gowdeyi* were collected in large numbers on flowers of various plants especially of those of Graminae.

Fig. 85. Distribution of *Haplothrips* species in the Philippines and world.

- ● *H. chinensis* Priesner
- ✪ *H. euphorbiae* Priesner
- ⬤ *H. ganglbaueri* Schmutz


120°
20°
15°
10°
125°

Genus *Holothrips* Karny

Holothrips Karny, 1911c: 502.
Type species: *Holothrips ingens* Karny, by monotypy.

Diagnosis. Head usually longer than wide, sometimes extended dorsally, dorsal surface partly or completely sculptured. Antennae 7-segmented; segments VII and VIII completely fused, sometimes with complete or incomplete suture; segment III with 3 sense cones; IV with 4 sense cones. Maxillary stylets usually long and moderately robust, closed together in middle of head, sometimes short and rather wide apart; maxillary bridge usually absent, sometimes present but weak and narrow. Mouthcone short or long and rounded or pointed.

Pronotum with major setae well developed. Epimeral sutures usually complete. Praepectal plates absent. Foretarsi each with a tooth in both sexes. Forewings parallel-sided and with duplicated cilia. Metanotal median pair of setae usually weak; metathoracic sternopleural sutures present.

Pelta bell-shaped or triangular and with or without pair of campaniform sensilla. Sternites IV-VII each usually with transverse reticulate areas in males. Tube variable in shape, shorter or longer than head.

Okajima (1987) presented a key to the 69 known old world species including those known from the Philippines. Representatives of all species known are believed to be fungus feeders and are usually collected on dead leaves and branches. These yellow to dark brown species which usually have red, hypodermal pigment, possess robust maxillary stylets similar to those found in *Apelaunothrips* Karny and related genera. One hundred and sixteen species are known worldwide (Okajima, 1987) of which 8 are known from the Philippines.

Key to Philippine species of *Holothrips* Karny

1 Mouthcone long and pointed; pelta bell-shaped and with campaniform sensilla 2

1' Mouthcone short, rounded; pelta bell-shaped or weakly developed 3

2(1) Forewings each with 11 to 14 duplicated cilia; tube almost parallel-sided .... *H. cupreus* Okajima

2' Forewings each with 9 to 10 duplicated cilia; tube weakly constricted in basal third and at apex .... *H. pictus* Okajima

3(1') Maxillary bridge present; tube longer than head 4

3' Maxillary bridge absent; tube shorter than head 6

4(3) Maxillary stylets not retracted to level of postocular setae; head incut behind eyes; .... *H. maxillae* Okajima

4' Maxillary stylets reaching level of postocular setae; head not incut behind eyes 5

5(4') Postocular setae shorter than dorsal length of eyes; forewings each with 18 to 23 duplicated cilia; head with dorsal surface sculptured. .... *H. apoensis* Okajima

5' Postocular setae longer than dorsal length of eyes; forewings each with 16 to 20 duplicated cilia; head with dorsal surface weakly sculptured laterally .... *H. flavus* Okajima

6(3') Pelta weakly developed; foretarsal tooth directed forward; pronotum about twice as wide as long .... *H. brevitubus* Okajima

6' Pelta bell-shaped; foretarsal tooth very small or absent 7

7(6') Metascutum with a series of 13 setae; tube yellow in basal half, body brown .... *H. setosus* Okajima

7' Metascutum without a series of such setae; tube orange yellow in basal half; body yellow .... *H. luminosus* Okajima

Holothrips apoensis Okajima
Holothrips apoensis Okajima, 1987b: 16-17.
Holotype female, Philippines: Mindanao: Agko, Mt. Apo (**TMNH**) [examined]

Diagnosis. Body brown to dark brown, with head slightly darkened laterally. Body setae yellowish. Head longer than wide, reticulate except ocellar area smooth. Postocular setae shorter than dorsal length of eyes, with blunt apices. Antennal segment III yellow. Maxillary bridge weak. Pronotal major setae developed, with weakly expanded apices. Legs generally brown. Forewings pale each with brown, median, longitudinal stripe and duplicated cilia. Pelta triangular. Tube dark and longer than head.

This species is known only from the type material. Adults of *H. apoensis* resemble those of *H. flavus* and *H. maxillae* in having a degenerate maxillary bridge but differ in having the head distinctly sculptured and dorsal and postocular setae shorter.

Female macroptera. Head 1.06 to 1.10 times as long as wide; reticulate except ocellar area smooth. Postocular setae much shorter than dorsal length of eyes and with blunt apices. Cheeks subparallel and slightly constricted at base. Antennae 2.17 to 2.20 times as long as head; segments I and II brown; III yellow; basal half of IV to VI yellowish, apical half brownish; VII brown. Maxillary bridge degenerate. Mouthcone short.

Pronotum 1.88 to 1.95 times as wide as long; slightly reticulate; major setae developed and slightly expanded apically; anteroangular setae longer than anteromarginals. Legs generally brown; tibiae with pale apices. Forewings pale each with brown, median, longitudinal stripe and 18 to 23 duplicated cilia; subbasal wing setae S1 with expanded apices; S2 and S3 setae with blunt or nearly pointed apices.

Pelta triangular, with fine reticulation; campaniform sensilla absent. B1 and B2 setae of tergites II to VIII with blunt or slightly expanded apices. BI and B2 setae of tergite IX with slightly pointed apices; B1 setae shorter than tube. Tube dark brown, pale on apical fifth, longer than head; surface with slightly reticulate. Anal setae shorter than tube.

Male macroptera. Similar to female in general color except foretibiae pale. Head shorter; maxillary stylets not retracted to level of postoculars; and abdominal sternites V to VI each with transverse reticulate area.

Material examined. Holotype female, PHILIPPINES: Mindanao: Agko, Mt. Apo, on dead leaves, 3-VIII-1979, S. Okajima; **Paratypes** (1 female, 1 male) same data as holotype (**TMNH**).

Distribution (Fig. 86). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo.

Host. dead leaves.

Holothrips brevitubus **Okajima**

Holothrips brevitubus Okajima, 1987b: 20.
Holotype female:, Philippines: Luzon: Bicol National Park (**TMNH**) [examined]

Diagnosis. Body weakly sclerotized or pale brown. Body setae yellowish. Head longer than wide, weakly reticulate. Postocular setae slightly longer than dorsal length of eyes and slightly expanded at apices. Antennal segment III brownish yellow. Pronotum about twice as wide as long; pronotal major setae developed and with slightly expanded apices. Legs bicolored. Forewings greyish, with duplicated cilia. Pelta slightly developed. Tube brown, with pale apex and shorter than head.

This species is known only from the Philippines. Adults of *H. brevitubus* resemble those of *H. setosus* and *H. luminosus* in not having a maxillary bridge and tube shorter than head but differ principally in having the foretarsal tooth directed forward and pronotum about twice as wide as long.

Female macroptera. Head 1.4 times as long as wide and slightly reticulate. Eyes less than 0.35 times as long as head. Postocular setae slightly longer than dorsal length of eyes and slightly expanded apically. Antennae about 1.75 times as long as head; segments I and II brown; III brownish yellow; IV to VI brownish yellow, apical half brown; VII brown. Mouthcone short and rounded.

Pronotum about 2.0 times as wide as long; slightly sculptured posteriorly; major setae developed and slightly expanded apically; anteromarginal setae slender. Probasisternum weak. Femora brown; tibiae and tarsi whitish yellow; foretarsal tooth short, directed forwards. Forewings shaded with light grey, each with 5 to 6 duplicated cilia.

Pelta weak, weakly reticulate; pair of campaniform sensilla present. Anterior pair of wing retaining setae on tergite VII reduced; posterior pair short, straight. B2 setae of tergites III to VII pointed or slightly pointed apically. B1 and B2 setae of tergite IX with pointed apices. Tube brown, pale apically; about 0.55 times as long as head; surface smooth. Anal setae a little longer than tube.

Male macroptera. Similar to female in color. Pronotum and forefemora slightly enlarged. Foretarsal tooth stouter, with wide base and directed inwards. Forewings each with 6 to 8 duplicated cilia. Abdominal sternites V to VI each with transverse reticulate area.

Material examined. **Holotype** female, PHILIPPINES: Luzon: Bicol National Park, on dead branches, 13-VIII-1979, S. Okajima; **Paratype** (1 male) same data as holotype (**TMNH**).

Distribution (Fig. 86). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Bicol National Park; Quezon National Forest Park.

Hosts. dead branches, dead leaves.

***Holothrips cupreus* Okajima**
Holothrips cupreus Okajima, 1987b: 23-24.
Holotype female, Philippines: Mindanao: Mt. Apo (TMNH)[examined].

Diagnosis. Body dark to dark brown. Body setae dark. Head longer than wide, reticulate posteriorly. Postocular setae slightly longer than dorsal length of eyes and with expanded apices. Antennal segment III yellow, shaded with brown apically. Pronotal major setae developed and with expanded apices. Legs bicolored. Forewings light brown, with duplicated cilia. Pelta bell-shaped. Tube dark, shorter than head.

Adults of this species resemble those of *H. pictus* in having a long and pointed mouthcone but differ from the latter in having a parallel-sided tube. This species is known only from the Philippines.

Female macroptera. Head darker than pronotum, 1.18 times as long as wide; reticulate posteriorly. Eyes less than 0.30 times as long as head. Postocular setae slightly longer than dorsal length of eyes and expanded apically. Cheeks slightly rounded, gradually narrowed towards base. Antennae about 1.8 times as long as head, generally brown except segment III yellowish, shaded with brown apically. Mouthcone long and pointed.

Pronotum 1.64 to 1.70 times as wide as long; slightly reticulate posteriorly; major setae developed, with expanded apices; anteroamarginal setae shorter than anteroangulars. Femora brown; tibiae and tarsi whitish yellow. Forewings shaded with light brown and with 11 to 14 duplicated cilia; subbasal wing setae with expanded apices.

Pelta bell-shaped, slightly wider than long, reticulate; pair of campaniform sensilla present. B1 setae of tergites II to VII and B2 setae of tergites III to V and VIII with expanded apices. B1 setae of tergite IX and B2 setae of tergites VI, VII and IX with sharply pointed apices. Tube dark, nearly parallel-sided; surface smooth; about 0.7 times as long as head. Anal setae about as long as tube or a little shorter.

Male. Unknown.

Material examined. Holotype female, PHILIPPINES: Mindanao: Mt. Apo, on dead leaves of evergreen trees, 30-VII-1979, S. Okajima (**TMNH**).

Distribution (Fig. 86). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Mindanao. PHILIPPINES: Mindanao: Mindanao: Mt. Apo; Ilomavis, [Kidapawan], North Cotabato.

Hosts. dead leaves of evergreen trees, dead leaves

***Holothrips flavus* Okajima**
Holothrips flavus Okajima, 1987b: 27.
Holotype female, Philippines: Luzon: Quezon National Forest Park (**TMNH**) [examined].

Diagnosis. Body yellow. Body setae yellowish. Head longer than wide, slightly reticulate. Postocular setae longer than eyes, with blunt apices. Antennae very slender; segment III more than 3 times as long as wide. Maxillary bridge degenerate. Pronotal major setae developed, with weakly expanded apices. Legs bicolored; foretarsal tooth present. Forewings greyish with duplicated cilia. Pelta slightly developed. Tube orange yellow, pale basally and apically, with extreme apex dark, longer than head.

Adults of *H. flavus* differ from *H. apoensis* in having weakly sculptured head and longer postocular setae. This species is known only from the type material.

Female macroptera. Head 1.13 to 1.14 times as long as wide; slightly reticulate laterally. Eyes 0.36 to 0.38 times as long as head. Postocular setae developed, longer than eyes and with blunt apices. Cheeks slightly rounded and constricted at base. Antennae very slender, about 2.55 to 2.60 times as long as head; segment III more than 3 times as long as wide; VII shaded with pale brown. Maxillary bridge degenerate. Mouthcone short and rounded.

Pronotum 1.84 to 1.94 times as wide as long; slightly reticulate posteriorly; major setae developed, slightly expanded apically; anteroangular setae longer than anteromarginals; posteroangular setae longer than epimerals. Forefemora, tibiae and tarsi yellow; mid and hindfemora shaded with pale brown; foretarsal tooth short, blunt and directed forward. Forewings shaded with grey each with 16 to 20 duplicated cilia; subbasal wing setae developed, with slightly expanded apices. Mesonotum shaded with brown.

Pelta slightly developed, bell-shaped; campaniform sensilla absent. B1 setae of tergites II to VIII and B2 setae of tergites III to VIII with blunt or slightly expanded apices. B1 and B2 setae of tergite IX with pointed apices; B1 setae longer than tube. Tube orange yellow, pale basally and apically, with extreme apex dark; 1.17 to 1.20 times as long as head; slightly constricted apically; surface slightly reticulate. Anal setae shorter than tube.

Male macroptera. Similar to female in color. Head and tube shorter. Pronotum narrower. Forefemora enlarged, each with subbasal hump on inner surface. Foretarsal tooth stout. Abdominal sternites V to VI each with transverse orange yellow band of reticulation.

Material examined. Holotype female, PHILIPPINES: Luzon: Quezon National Forest Park, on dead branches, 22-VIII-1979, S. Okajima; **Paratypes** (2 females, 1 male) same data as in holotype (**TMNH**).

Distribution (Fig. 86). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Luzon. PHILIPPINES: Luzon: Quezon National Forest Park.

Host. dead branches.

Holothrips luminosus **Okajima**

Holothrips luminosus Okajima, 1987b: 33.
Holotype female, Philippines: Luzon: Bicol National Park (TMNH)[examined]

Diagnosis. Body yellow. Body setae yellowish. Head longer than wide, with distinct reticulation. Postocular setae longer than dorsal length of eyes, with expanded apices. Antennal segment III deep yellow. Pronotal major setae developed, with expanded apices. Legs generally yellow; mid and hindfemora shaded with brown. Forewings light brown, with duplicated cilia. Pelta bell-shaped. Tube orange yellow on basal half, yellowish on apical half, extreme base pale, extreme apex brown, shorter than head.

Adults of *H. luminosus* resemble those of *H. setosus* in having a bell-shaped pelta but differ principally in having yellow body and by the absence of a series of setae on metascutum. This species is known only from the Philippines.

Female macroptera. Head 1.43 times as long as wide; widest behind eyes; distinctly reticulate. Eyes less than 0.25 times as long as head. Postocular setae longer than dorsal length of eyes, with expanded apices. Antennae less than 2 times as long as head; segments I and II yellow; III deep yellow; IV to VI brownish yellow; VII brown. Mouthcone short and rounded.

Pronotum 1.8 times as wide as long; slightly reticulate near posterior margin; major setae developed with expanded apices; anteroangular setae longer than anteromarginals. Legs generally yellow; mid and hindfemora shaded with brown. Forewings shaded with light brown, each with 9 duplicated cilia; subbasal wing setae with expanded apices. Mesonotum shaded with brown.

Pelta bell-shaped; slightly reticulate; campaniform sensilla absent. B1 setae of tergites II to VIII and B2 setae of tergites III to V and VII with expanded apices. B2 setae of tergite VI slightly expanded apically. B1 and B2 setae of tergite IX and B2 setae of VII long, with pointed apices; B1 setae longer than tube. Tube orange yellow on basal half, yellowish on apical half, extreme base pale, extreme apex brown; about 0.6 times as long as head, nearly parallel-sided, smoothly narrowed towards apex. Anal setae shorter than tube.

Male. Unknown.

Material examined. Holotype female, PHILIPPINES: Bicol National Park, 13-VIII-1979, S. Okajima (**TMNH**).

Distribution (Fig. 86). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Luzon. PHILIPPINES: Luzon: Bicol National Park; Quezon National Forest Park.

Host. dead branches.

***Holothrips maxillae* Okajima**
Holothrips maxillae Okajima, 1987b: 33-34. Male, female.
Holotype female, Philippines: Mindanao: near Marber [Marbel] river, Mt. Apo (TMNH)[examined]

Diagnosis. Body yellowish brown to brown. Body setae yellowish. Head longer than wide, slightly striate laterally. Postocular setae shorter than dorsal length of eyes, with slightly pointed apices. Antennal segment III yellow. Pronotal major setae developed, with expanded apices. Legs bicolored; foretarsal tooth present. Forewings pale, with brown, median, longitudinal stripe and duplicated cilia. Pelta bell-shaped. Tube brown in basal two-thirds, yellowish at apical third, shorter than head.

Adults of *H. maxillae* resemble those of *H. apoensis* and *H. flavus* in having a weak maxillary bridge but differ from those of the 2 species in having shorter maxillary stylets and head incut behind eyes. This species is known only from the Philippines.

Female macroptera. Head 1.19 to 1.25 times as long as wide; slightly striae laterally. Ocellar region smooth. Eyes about 0.39 to 0.42 times as long as head. Postocular setae much shorter than eyes, with slightly pointed apices. Cheeks subparallel-sided; slightly incut behind eyes and constricted at base. Antennae 2.2 to 2.3 times as long as head; segment I brown; II brown with pale apex; III to VI yellowish, VI shaded with brown apically; VII yellowish at base. Mouthcone short and rounded.

Pronotum 1.3 to 1.5 times as wide as long; slightly reticulate laterally and posteriorly; major setae developed, expanded apically; anteromarginal setae shorter than anteroangulars. Femora brown; foretibiae yellowish brown; mid and hindtibiae brown with pale bases and apices; foretarsal tooth directed forward. Forewings pale, with light brown, median, longitudinal stripe; duplicated cilia 20 to 34; subbasal wing setae S1 and S2 weakly expanded apically; setae S3 blunt.

Pelta bell-shaped; slightly reticulate; campaniform sensilla absent. B1 setae of abdominal tergites II to VIII, B2 setae of tergites III to VIII and B1 and B2 setae of tergite

IX slightly expanded apically; B1 setae longer than tube. Tube brown in basal two thirds, yellowish in apical third; slightly constricted apically; surface smooth; shorter than head. Anal setae shorter than tube.

Male macroptera. Similar to female in color. Head longer, eyes smaller, and pronotum wider. Forefemora enlarged. Foretarsal tooth stouter. Abdominal sternites V to VII each with a transverse reticulate area, most developed on sternite V.

Material examined. Holotype female, PHILIPPINES: Mindanao: near Marbel river, Mt. Apo, on dead leaves, 7-III-1978, N. Kashiwai; **Paratypes** (5 females, 3 males) same data as holotype (**TMNH**).

Distribution (Fig. 86). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: Quezon National Forest Park; Mindanao: near Marbel river, Mt. Apo.

Hosts. dead leaves of evergreen trees, dead leaves.

Holothrips pictus **Okajima**

Holothrips pictus Okajima, 1987b: 41-42.
Holotype female, Philippines: Luzon: Bicol National Park (**TMNH**)[examined].

Diagnosis. Body yellowish brown to brown. Body setae yellowish. Head longer than wide, slightly reticulate posterolaterally. Postocular setae about as long as dorsal length of eyes, with expanded apices. Antennal segment III yellow, with brown apex. Pronotal major setae developed, with expanded apices. Legs generally brown except forefemora yellowish. Forewings light brown, with duplicated cilia. Pelta bell-shaped. Tube orange yellow, pale basally and apically, extreme apex dark, shorter than head.

This species is related to the Indian species *H. indicus* Ananthakrishnan and to the Andaman species, *H. andamanensis* (Sen) (Okajima, 1987b). Adults of this species resemble those of *H. cupreus* in having a long and pointed mouthcone but differ from the latter in having the tube weakly constricted in the basal third and at apex.

Female macroptera. Head yellow, shaded with brown anteriorly, 1.15 to 1.17 times as long as wide, widest behind eyes; slightly reticulate posterolaterally. Eyes 0.30 times as long as head. Postocular setae about as long as eyes, with expanded apices. Cheeks slightly rounded and gradually narrowed towards base. Antennae about 1.9 times as long as wide; segments I and II yellowish; III yellow with brown apex; IV to VII brown, IV pale at base. Mouthcone long and pointed.

Pronotum brown,1.5 to 1.6 times as wide as long; slightly reticulate posteriorly; major setae developed, with expanded apices. Legs generally brown except forefemora yellowish. Forewings shaded with pale brown each with 9 to 10 duplicated cilia; subbasal wing setae developed, with expanded apices. Mesonotum light brown. Metanotum yellow.

Pelta bell-shaped, slightly wider than long; reticulate; pair of campaniform sensilla present. Abdomen yellowish brown. B1 setae of tergites II to VIII and B2 setae of tergites III to VI and tergite VIII with expanded apices. B1 setae of tergite IX and B2 setae of tergites VII and IX with pointed apices. Tube orange yellow, pale basally and apically, extreme apex dark; slightly constricted at basal third and apex; about 0.73 to 0.75 times as long as head; surface smooth. Anal setae about as long as tube.

Male macroptera. Similar to female in color. Pronotum with distinct median thickening. Ventral surface of tube with transverse rows of fine reticulation. Abdominal sternites VI to VII each with transverse reticulate area.

Material examined. Holotype female, Bicol National Park, on dead branches, 13-VIII-1979, S. Okajima. Other. 1 male, Bicol National Park, on dead leaves, II-VIII-1979, S. Okajima (**TMNH**).

Distribution (Fig. 86). The known range of this species extends from Malaysia to Indonesia Archipelago and eastward to Hawaii Islands. In the Philippine Archipelago, this species is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: Bicol National Park; Mindanao: Ilomavis, [Kidapawan], North Cotabato; Agko, Mt. Apo. INDONESIA: Java; Sulawesi. MALAYSIA: Kuala Lumpur. SINGAPORE. U.S.A.: Hawaii.

Hosts. dead branches, dead leaves, dried legume stems, dead twigs, sweeping

Holothrips setosus **Okajima**
Holothrips setosus Okajima, 1987a: 47-48.
Holotype female, Philippines: Agko, Mt. Apo (**TMNH**) [examined]

Diagnosis. Body brown. Body-setae yellowish. Head longer than wide, distinctly reticulate. Postocellar setae well developed. Postocular setae longer than dorsal length of eyes, with slightly expanded apices. Antennal segment III brown. Pronotal major setae well developed, with slightly expanded apices except anteromarginals with pointed apices. Legs bicolored. Forewings light brown, with duplicated cilia. Pelta bell-shaped. Tube yellow on basal half, greyish brown on apical half, shorter than head.

This species is known only from the type material. Adults of this species are unique in having a series of 13 setae on the metascutum (Okajima, 1987a).

Female macroptera. Head brown, with anterior half shaded with yellow; 1.25 times as long as wide, widest behind eyes; distinctly reticulate. Postocellar setae developed, longer than diameter of posterior ocelli. Eyes less than 0.40 times as long as head. Postocular setae longer than dorsal length of eyes, with slightly expanded apices. Cheeks emarginate. Antennae about 2.3 times as long as head; segments I and II brown; III to VIII brown to dark brown; VII longer than segment III. Mouthcone short and rounded.

Pronotum 2.65 times as wide as long; anterior margin shallowly V-shaped; slightly reticulate posteriorly; anteromarginal setae short, with pointed apices; other major setae with slightly expanded apices. Femora brown, with pale apices; tibiae and tarsi whitish yellow; foretarsal tooth minute. Forewings shaded with light brown, each with 8 to 9 duplicated cilia; subbasal wing setae well developed, with slightly expanded apices. Metascutum with fine reticulation, with row of 13 setae.

Pelta bell-shaped, slightly reticulate; pair of campaniform sensilla present. Abdomen pale brown to brown, generally darkened posteriorly. Tergite VII with minute, simply curved wing retaining setae. B1 of tergites II to VIII and B2 setae of tergite VIII with expanded apices; B1 setae longer than tube. Tergite IX paler than tergite VIII, shaded with yellow. Tube narrowed at apex; about 0.74 times as long as head; surface smooth; yellow in basal half, greyish brown in apical half. Anal setae shorter than tube.

Male. Unknown.

Material examined. Holotype female, PHILIPPINES: Mindanao: Agko, Mt. Apo, 30-VII-1979 S. Okajima (**TMNH**).

Distribution (Fig. 86). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. apo.

Host. dead leaves of evergreen tree

Fig. 86. Distribution of *Holothrips* species in the Philippines, and world.

☆ *H. apoensis* Okajima

● *H. brevitubus* Okajima

• *H. cupreus* Okajima

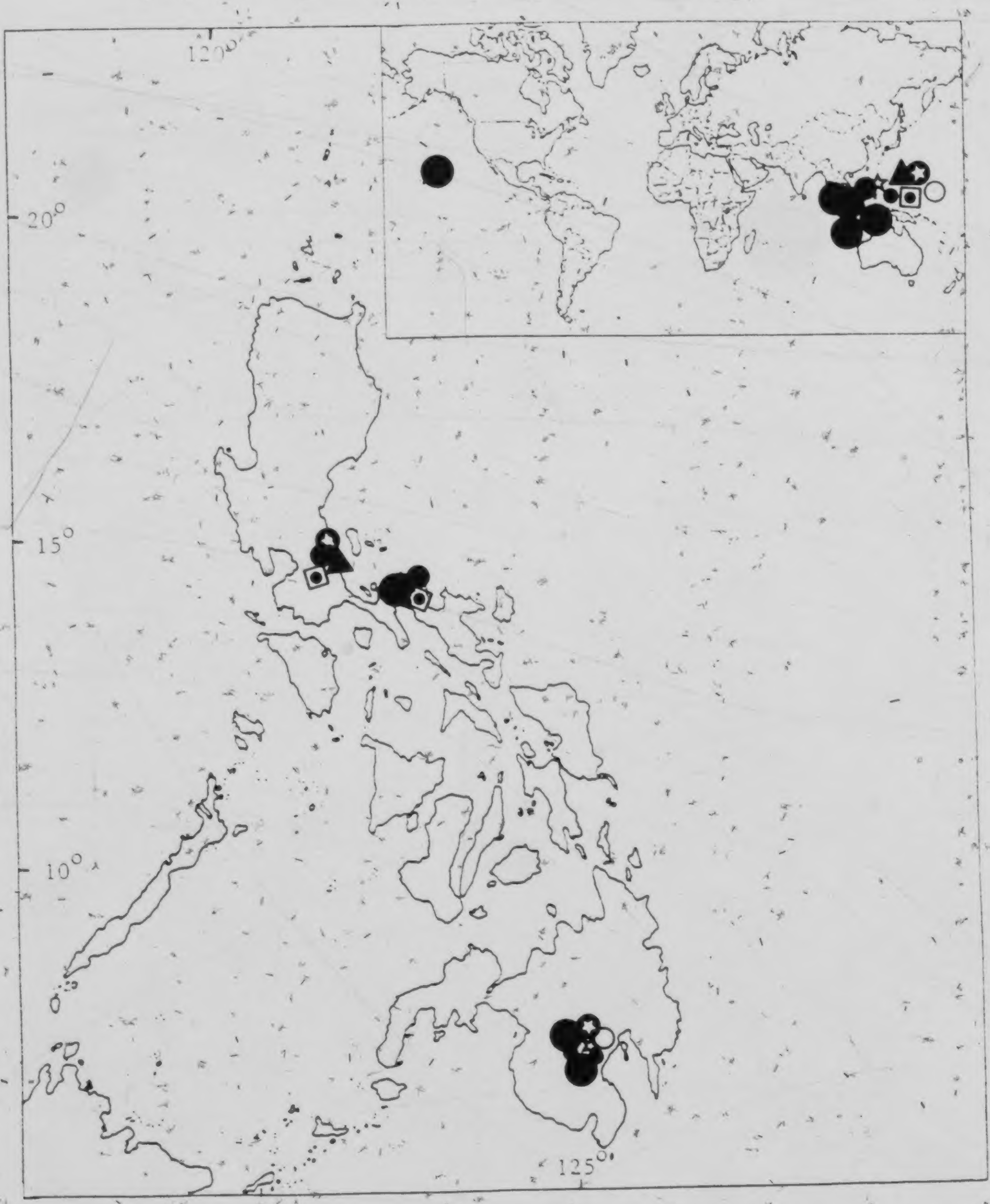
▲ *H. flavus* Okajima

⊡ *H. luminosus* Okajima

✪ *H. maxillae* Okajima

⬤ *H. pictus* Okajima

○ *H. setosus* Okajima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Genus *Hoplandrothrips* Hood

Hoplandrothrips Hood, 1912: 145, as subgenus of *Phloeothrips*
Type species: *Phloeothrips* (*Hoplandrothrips*) *xanthopus* Hood, a synonym of
Phloeothrips jennei Jones, by original designation.

Diagnosis. Head moderate in size, weakly reticulate. Eyes medium-sized to large and somewhat bean-shaped. Ocelli present in macropterous and brachypterous forms. Postocular setae long, expanded at apex. Cheeks slightly expanded, with setae, basal pair often stouter than the rest. Antennae 8-segmented, with 3 sense cones on segment III, 3 or 4 on segment IV; segment III asymmetrical. Maxillary stylets retracted far into head, slender, closed together medially in head; maxillary bridge absent. Mouthcone long, extended to posterior margin of prosternum.

Pronotum weakly reticulate, with all major setae developed and expanded at apices; epimeral sutures complete. Praepectal plates absent. Probasisternum divided. Forefemora slightly enlarged, larger males usually with 2 pointed tubercles near inner apices. Foretarsal tooth present in both sexes. Macropterous or brachypterous. Forewings constricted medially, with duplicated cilia. Mesopraesternum boat-shaped; mesonotal lateral setae developed. Metanotum with elongate sculpture either of hexagonal reticulations or longitudinal striations.

Pelta small, reticulate and bell-shaped to triangular, with pair of campaniform sensilla. Abdominal tergites II - VII each with 2 pairs of sigmoidal, wing retaining setae; tergite IX with B1 setae pointed, blunt or expanded at apices, shorter than tube; tube shorter than head. Males usually with small, circular, weak glandular area on abdominal sternite VIII. Anal setae about as long as tube.

Adults of *Hoplandrothrips* species can be distinguished by the following combination of characters: usually with pointed mouthcone, slightly widened cheeks bearing a prominent, posterior pair of setae, strong reticulations on at least the metanotum, and with a small, bell-shaped pelta. The genus presently includes about 70 species, mainly from the New World (Mound and Walker, 1986). Members of this genus are closely related to *Ecacanthothrips* Bagnall. Members of *Ecacanthothrips* can be distinguished from those of *Hoplandrothrips* and *Hoplothrips* by having numerous large sense cones in antennal segment III. Adults of *Hoplothrips* species differ from those of *Hoplandrothrips* in their parallel-sided forewings and lack of metanotal sculpture.

Key to Philippine species of *Hoplandrothrips* Hood

1 Abdominal tergites II to VII with small dentate-like reticulation laterally; cheek setae fine (Fig. 87a); body brown .... *H. apoi* , n. sp.

1' Abdominal tergites II to VII with weak reticulation; cheek setae moderately developed; body bicolored .... *H. flavipes* Bagnall

***Hoplandrothrips apoi*, n. sp.**
Holotype female, Philippines: Mindanao: Agko, Mt. Apo (**UPLB**)
Figure 87a, b, c, d

Diagnosis. Body brown. Body setae brownish, expanded apically. Postocular setae shorter than dorsal length of eyes. Cheeks with fine setae. Antennal segments III and IV with 3 and 4 sense cones respectively. Major pronotal setae developed, with expanded apices. Legs bicolored. Forewings brown in apical three-quarters, yellowish in basal quarter. Pelta bell-shaped. Abdominal tergites II to VII with dentate reticulation laterally. Tube shorter than head.

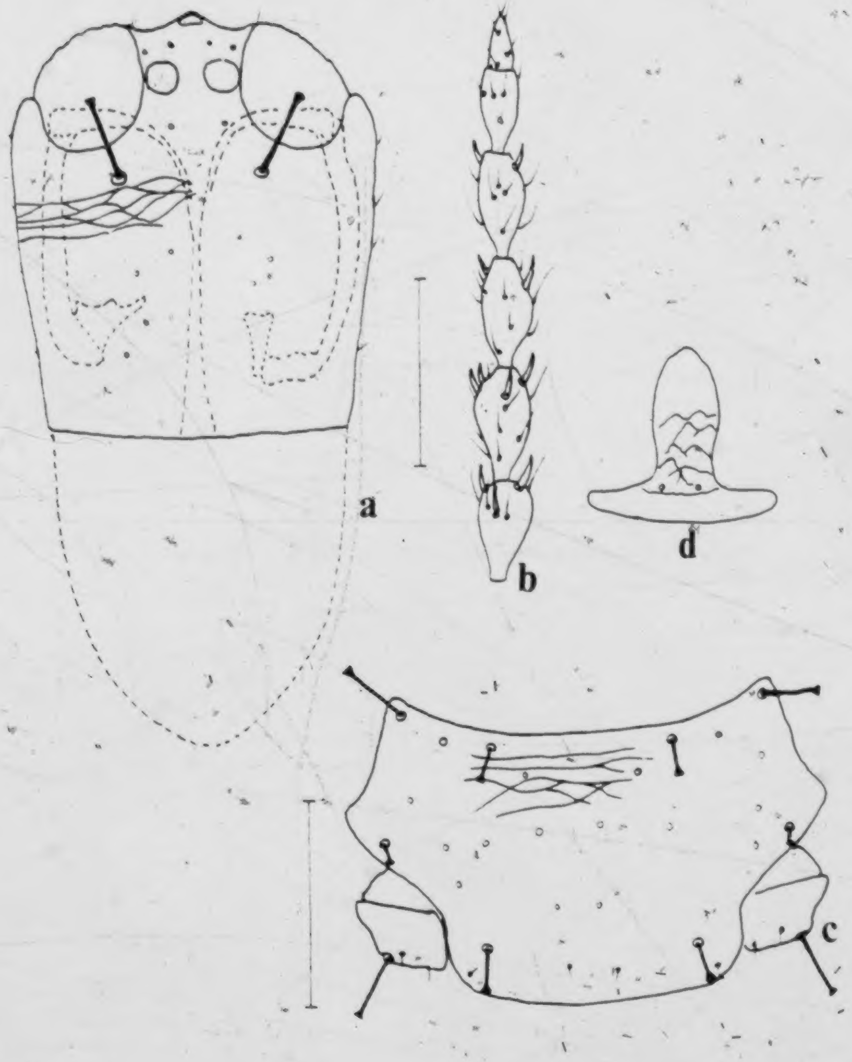
Adults of *H. apoi*, n. sp. differ from those of *H. flavipes* in having fine cheek setae, a uniformly brown rather than bicolored body, and abdominal tergites II to VII with small dentate-like reticulation laterally. This species is known only from the type material.

Female macroptera. Head longer than wide, widest behind eyes and gradually narrowed towards base; reticulate (Fig. 87a). Ocelli large. Postocular setae shorter than dorsal length of eyes, with expanded apices. Cheeks with fine setae. Antennae brownish; III with yellowish base; VIII broad at base; segments III and IV with 3 and 4 sense cones respectively (Fig. 87b). Mouthcone rounded, reaching posterior margin of prosternum (Fig. 87a).

Pronotum with major setae developed, expanded apically; anteroangular setae slightly longer than epimerals (Fig. 87c). Femora brown, with pale apices; tibiae yellowish with dark lateral margins; tarsi yellow; foretarsi each with small tooth. Forewings yellowish in basal quarter, brownish in apical three-quarters; subbasal wing setae developed, with expanded apices; setae S3 longest. Metascutum longitudinally reticulate.

Pelta bell-shaped, reticulate; pair of campaniform sensilla present (Fig. 87d). Tergal lateral setae well developed, with expanded apices. Tergites II to VII with dentate reticulation laterally; wing retaining setae 2 pairs. B1 setae of tergite IX slender, shorter

Fig. 87. *Hoplandrothrips apoi*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta


a
b
d
c

than tube, with pointed apices. Tube conical, pale basally and apically, shorter than head. Anal setae well developed.

Dimensions (holotype female; um). Body length (extended) 1951.6. Head length 219.6, median width 147.9; dorsal eye length 64.6, postocular setae 37.4, antennal segments length: I 44.2; II 47.6; III 57.8; IV 57.8; V 56.1; VI 52.7; VII 40.8; VIII 23.8. Pronotum length 130.9, median width 187, major setae length: aa 44.2, am 28.9, ml 11.9, pa 18.7, ep 42.5. Tergite IX setae length: B1 81.6, B2 98.6, B3 119. Tube length: 129.2.

Type data. **Holotype** female, PHILIPPINES; Mindanao: Agko, Mt. Apo, host unknown, 3-V-1987, C.P. Reyes (**UPLB**).

Male. Unknown.

Material examined. **Holotype** only (**UPLB**).

Etymology. This species is named after Mt. Apo in reference to the type locality of this thrips.

Distribution (Fig. 88). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo.

Host. unknown

***Hoplandrothrips flavipes* Bagnall**
Hoplandrothrips flavipes Bagnall, 1923: 628.
Holotype unknown, Kenya: Kijalie Kikuyu Escarpment (**?Unknown**)[not examined]

Diagnosis. Body bicolored. Head, pronotum, abdominal tergites VII to IX and base of tube brown; tergites III to V and apical half of tube yellow; tergites II and VI brownish yellow. Body setae brownish, with expanded apices. Head longer than wide and widest behind eyes. Eyes about one-third of head length. Postocular setae about as long as dorsal length of eyes, with expanded apices. Antennal segment III yellowish brown, vasiform. Pronotal major setae developed and with expanded apices. Foretarsi each with small tooth. Forewings yellowish, with duplicated cilia. Pelta bell-shaped. Tube shorter than head.

I was able to examine a female paratype of *Phloethrips kinugasai* Kurosawa deposited at SMFG which zur Strassen (1983) treated as a junior synonym of *H. flavipes*. The color of abdominal tergites of specimens from the Philippines is variable.

Female macroptera. Head brown, 1.2 to 1.4 times as long as wide, widest behind eyes; reticulate. Ocelli large. Eyes about 0.30 times as long as head. Postocular setae as long as or slightly longer than eyes, with expanded apices. Cheeks setae few, moderately developed. Antennal segments I and II dark brown; III vasiform, III to VI yellowish in basal third, brown on apical two-thirds; VII to VIII brown; segment VIII constricted at base. Mouthcone pointed, extending across anterior two-thirds of prosternum.

Pronotum brown; major setae developed, with expanded apices; epimeral setae about as long as posteroangulars. Femora brown with pale apices; forefemora enlarged; tibiae and tarsi yellow; foretarsi each with small tooth. Forewings yellowish, each with 9 to 10 duplicated cilia; subbasal wing setae well developed, with expanded apices. Metanotum reticulate.

Pelta bell-shaped, reticulate, with pair of campaniform sensilla. Abdomen bicolored; lateral setae of tergites placed in a row. Tergites III to V usually yellowish, with small median shaded area. Tergites II and VI brownish yellow, II yellowish medially.

Tergites VII to IX brown. Tergites II to VII each with 2 pairs of wing retaining setae. B1 setae of tergite IX shorter than tube, with pointed apices. Tube conical, brown in basal half, yellow in apical half; shorter than head. Anal setae shorter than tube.

Male macroptera. Similar to female in general structure and color but body smaller. Not yet known in the Philippines.

Material examined. 1 female, Makiling Rainforest, Mt. Makiling, Laguna, on litter, 27-VI-1987, C. P. Reyes; 1 female, IRRI, Los Banos, Laguna, on *Oryza sativa* leaves, 5-VII-1983, C. Hugo; 11 females, 3 males, Boay-Lienan, Abra, on *Pinus kosiya*, 26-II-1980, L. C. Raros; 1 female, Gaas, Baybay, Leyte, on leaf litter, 28-IX-1984, L. O. Abolla; 1 female, BFD, Sabsaban, Cabar, Brooks Point, Palawan, on *Moghania lineata*, 29-I-1985, C. P. Reyes (**CPRC**); 1 female, Philippines taken in quarantine at San Francisco, on *Vanda luzonica*. (**USNM**).

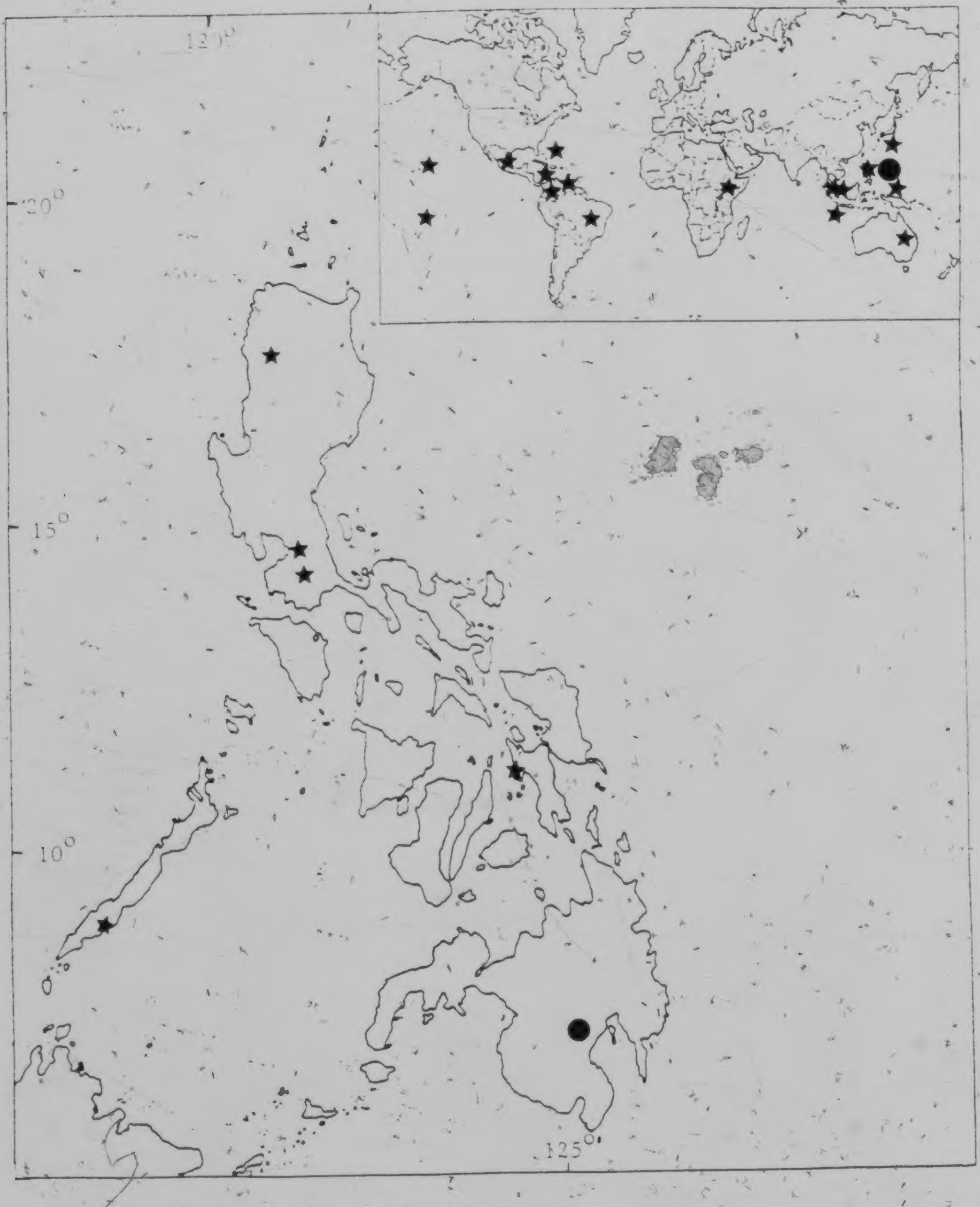
Distribution (Fig. 88). *H. flavipes* is widespread in the tropics (Mound and Houston, 1987). In the Philippine Archipelago, this species is known from the three principal zoogeographic regions, on the islands of Luzon, Palawan and Visayas. PHILIPPINES: Luzon: Manila, taken in quarantine at San Francisco; Makiling Rainforest, Mt. Makiling, Laguna; IRRI, Los Banos, Laguna; Boay-Lienan, Abra; Palawan: BFD, Sabsaban, Cabar, Brooks Point; Visayas: Baybay, Leyte. INDONESIA. MALAYSIA. SINGAPOIRE. JAPAN. AUSTRALIA. NEW GUINEA. KENYA. SAMOA. U.S.A.: Hawaii. BRAZIL. VENEZUELA. COLOMBIA. MEXICO. BAHAMAS. JAMAICA.

Hosts. *Vanda luzonica*, in litter, leaves of *Oryza sativa*, *Pinus kosiya*, in leaf litter, *Moghania lineata*., fungus-feeding on dead wood

Fig. 88. Distribution of *Hoplandrothrips* species in the Philippines, and world.

● *H. apoi*, n. sp.

★ *H. flavipes* Bagnall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20°
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Genus *Karnyothrips* Watson

Karnyothrips Watson, 1924: 23 (Replacement name for *Karnyia* Watson)
Type species: *Karnyia weigeli* Watson, by original designation.

Diagnosis. Head gradually narrowed towards base; slightly striate or smooth. Eyes medium-sized. Cheeks nearly smooth. Postocular setae developed, blunt or expanded apically. Antennae 8-segmented; segment III with 1 or 2 sense cones; segment IV with 2 to 4 sense cones. Maxillary stylets retracted into head and not reaching level of postocular setae; maxillary bridge present. Mouthcone elongate, rounded.

Pronotal anteromarginal setae vestigial; midlateral and posteromarginal and posteroangular setae developed, expanded apically. Epimeral sutures complete or incomplete. Praepectal plates present; mesopraesternum boat-shaped. Foretarsi each with small, forwardly directed tooth. Forewings constricted, with duplicated cilia.

Pelta reticulate. Abdominal tergites III - VII each with 2 pairs of well developed wing retaining setae. Tergite IX with B1 setae about as long as tube. Tube shorter than head.

Medium-sized brown or bicolored thrips which closely resemble those included in *Haplothrips*. Stannard (1957) synonymized *Karnyothrips* with *Haplothrips* but Mound and Houston (1987) believed this genus to be a useful segregate for a group of species predatory on scale insects. In his work on the thrips of Illinois, Stannard (1968) recognized *Karnyothrips* as a subgenus of *Haplothrips* while Pitkin (1976) elevated it to generic level in his revision of the Indian species of *Haplothrips* and related genera. Since the relationship of the *Karnyothrips* - and *Haplothrips*-genus groups can not be resolved until a world revision of these numerous but unremarkable thrips is available, I am recognizing *Karnyothrips* as a separate genus as most workers do. In reference to the Philippine species of *Karnyothrips* only, members of this genus are distinguished from those of *Haplothrips* Amyot and Serville and of related genera by the following characteristics: body more slender; postocular setae always moderately developed with blunt or expanded apices; foretarsal claws always directed forward; pronotal posteromarginal and posteroangular setae usually well developed, with blunt or expanded apices; antennal segment IV with 4 or fewer sense cones. Pitkin (1976) reported 5 five species of *Karnyothrips*, 2 of which and another 2 new species are known from the Philippines.

Key to Philippine species of *Karnyothrips* Watson

1 Postocular setae longer than dorsal length of eyes; body bicolored 2

1' Postocular setae shorter than or as long as dorsal length of eyes; body brown 3

2(1) Compound eyes about 0.35 times as long as head; maxillary stylets short; major setae of pronotum blunt or nearly knobbed at apex (Fig. 89c) .... *K. ateuchis*, n. sp.

2' Compound eyes about 0.25 times as long as head; maxillary stylets reaching level of postoculars; major setae of pronotum expanded at apex .... *K. melaleucus* (Bagnall)

3(1') Antennal segments IV to VIII dark brown; pelta triangular; pronotal anteromarginal setae vestigial .... *K. flavipes* (Jones)

3' Antennal segments IV to VI yellowish brown; bell-shaped; pronotal anteromarginal setae well developed (Fig. 90c) .... *K. expandosus*, n. sp.

***Karnyothrips ateuchis*, n. sp.**
Holotype female, Philippines: Luzon: Botanical Garden, Real, Quezon (**UPLB**)
Figure 89a, b, c, d.

Diagnosis. Body bicolored. Head and thorax brown; abdomen yellow except tube light brown. Postocular setae with blunt to nearly knobbed apices. Antennal segment III about as broad as IV, with 2 and 3 sense cones respectively. Major pronotal setae with blunt apices; anteromarginal setae vestigial as in most species. Legs bicolored; foretarsi without tooth. Forewings pale, brown at base. B1 setae of tergites including those on IX with pointed apices. Tube shorter than head.

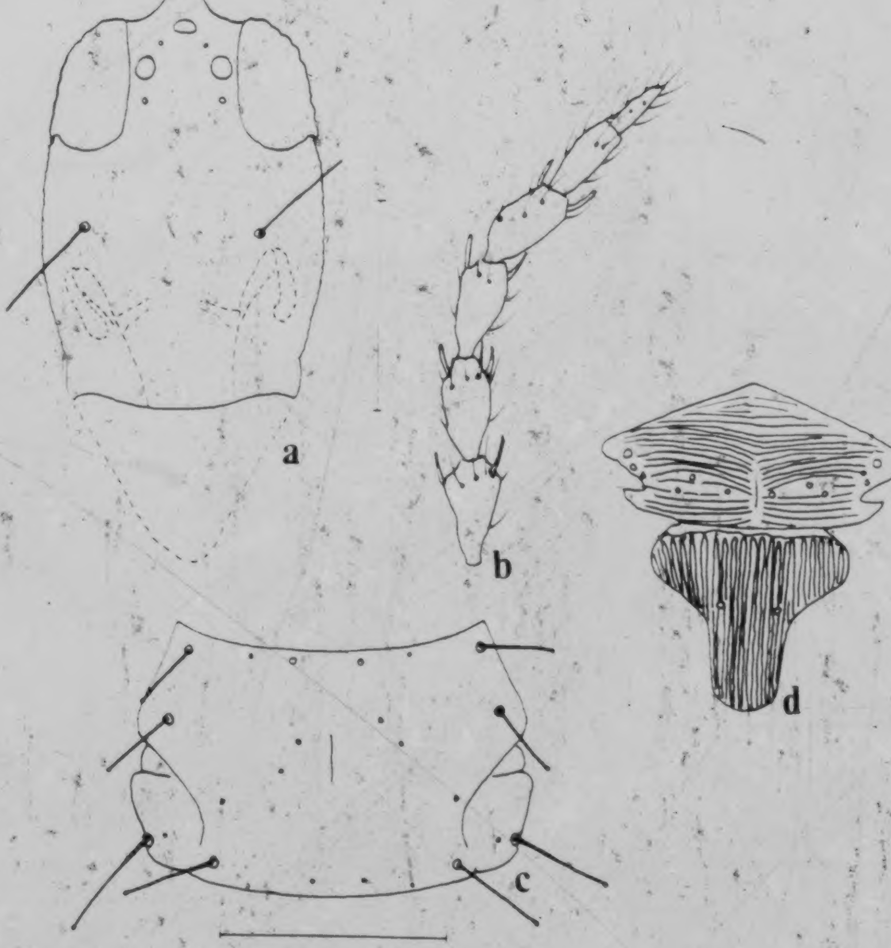
Adults of this species differ from those of *K. melaleucus* in shape of head, body color, shorter maxillary stylets, unarmed foretarsi and major body setae with blunt apices. This species is known from the type material only.

Female macroptera. Head brown, longer than wide, slightly constricted towards base (Fig. 89a). Ocelli moderately large. Eyes about 0.35 times as long as head. Postocular setae longer than eyes, with blunt to slightly knobbed apices. Antennal segment I brown; segment II yellowish, brown basally; III to VII yellow; VIII greyish brown; VII about 1.3 times as long as VIII; III about as broad as IV, with 2 and 3 sense cones respectively (Fig. 89b). Mouthcone rounded (Fig. 89a).

Thorax brown; pronotal major setae blunt apically; anteromarginal setae vestigial; midlateral setae equal to anteroangulars; epimeral setae longer than posteroangulars (Fig. 89d). Fore and midfemora brown, with yellow apices; forefemora enlarged; foretarsi each without tooth; fore and midtibiae and tarsi and hindlegs yellow. Forewings pale, with brown basal fifth and 2 to 4 duplicated cilia; subbasal wing setae dark, developed, with knobbed apices. Mesonotum transversely striate (Fig.). Metascutum longitudinally striate (Fig. 89d).

Abdomen yellow except tube light brown. Pelta ?triangular. Abdominal tergites II to VII with 2 pairs of wing retaining setae; B1 setae long, pale, with pointed apices. B1

Fig. 89. *Karnyothrips dieuchis*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Meso and metanota


a
b
c
d

setae of tergite IX longer than tube, pointed apically. Tube conical, shorter than head. Anal setae well developed.

Dimensions (holotype female; um). Body length (extended) 1666. Head length 197.2, median width 125.8; dorsal eye length 71.4; postocular setae length 62.9; antennal segments lengths: I 28.9; II 45.9; III 49.3; IV 49.3; V 45.9; VI 45.9; VII 42.5; VIII 34. Pronotum length 115.6, median width 161.5, major setae length: aa 42.5; ml 42.5; pa 51; ep 71.4. Tergite IX setae length: B1 125.8; B2 42.5; B3 141.1. Tube length: 156.4.

Type data. **Holotype** female, PHILIPPINES: Luzon: National Botanical Garden, Real Quezon, on leaves of *Melastoma* sp., 27-XI-1982, C. P.Reyes (**UPLB**); **Paratypes** (2 females, 2 males) same data as holotype (**UPLB**).

Male macroptera. Similar to female in color and structure but body smaller. Pronotal major setae and B setae on tergite IX shorter.

Dimensions (allotype male; um). Body length (extended) 1536.8. Head length 159.8, median width 110.5; dorsal eye length 59.5; postocular setae length 44.2; antennal segments lengths: I 23.8; II 39.1; III 47.6; IV 44.2; V 37.4; VI 36.6; VII 35.7; VIII 23. Pronotum length 102, median width 153, major setae length: aa 28.9; ml 28.9; pa 42.5; ep 61.2. Tergite IX setae length: B1 119; B2 40.8; B3 35.7. Tube length: 120.7.

Etymology. Ateuchis is a Greek word meaning "unarmed" referring to the lack of foretarsal tooth in these thrips.

Distribution (Fig. 91). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Botanical Garden, Real, Quezon.

Host. leaves of *Melastoma* sp.

***Karnyothrips expandosus*, n.sp.**
Holotype female, Philippines: Luzon: Bicol Expt. Sta. , Pili, Camarines Sur (UPLB)
Figure 90a, b, c, d

Diagnosis. Body brown. Head slightly constricted towards base. Postocular setae with expanded apices. Antennal segments III and IV with 2 and 4 sense cones respectively; segment III yellow, more slender than IV. Major pronotal setae well developed, with expanded apices; epimeral sutures complete. Legs brown. Forewings pale, with duplicated cilia. Pelta triangular, slender. B1 setae of tergite IX about as long as tube, with pointed apices. Tube shorter than head.

This species differs from *K. flavipes* in the shape of pelta; color of antennal segments; developed pronotal anteromarginal setae and complete epimeral sutures. This species is known only from the type material.

Female macroptera. Head longer than wide, slightly constricted towards base; transversely striate (Fig. 90a). Ocelli moderately large. Eyes about 0.25 times as long as head. Postocular setae with expanded apices, shorter than dorsal length of eyes. Antennal segments I and II brown; III yellow; IV to VI yellowish brown, gradually darkened towards distal segments; VII and VIII brown; segment III about as long as V, but narrower than IV; segments III and IV with 2 and 4 sense cones respectively (Fig. 90b). Mouthcone rounded (Fig. 90a).

Pronotum with developed major setae, expanded apically; anteroangular setae longer than anteromarginals and midlaterals; epimeral setae longer than posteroangulars; epimeral sutures complete (Fig. 90c). Legs generally brown, with light tarsi; foretibiae yellowish brown; foretarsi each with small tooth. Forewings pale, with 6 to 7 duplicated cilia; subbasal wing setae well developed, pale, with expanded apices. Mesonotum transversely striate, with small setae. Metascutum longitudinally striate; median setae small.

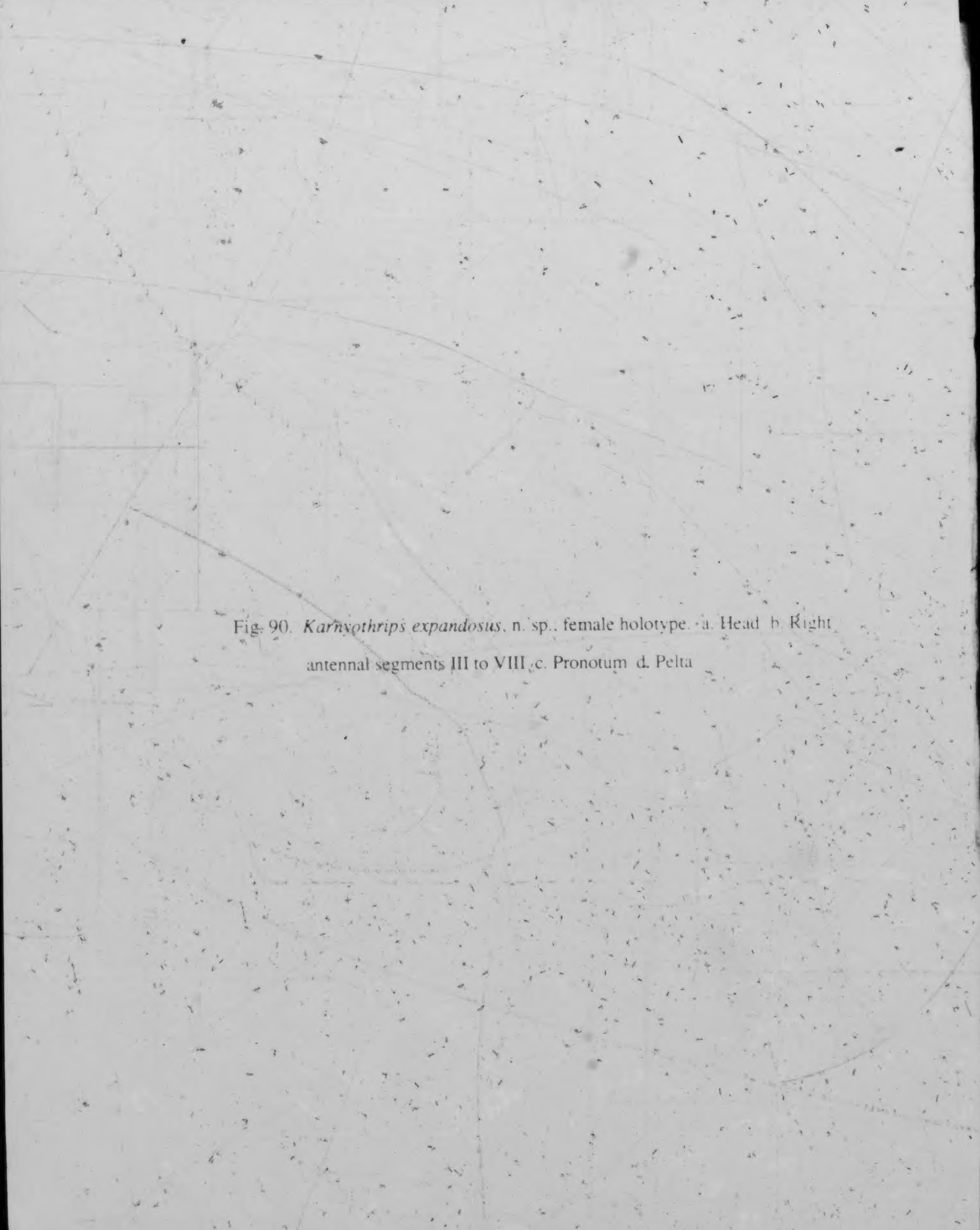
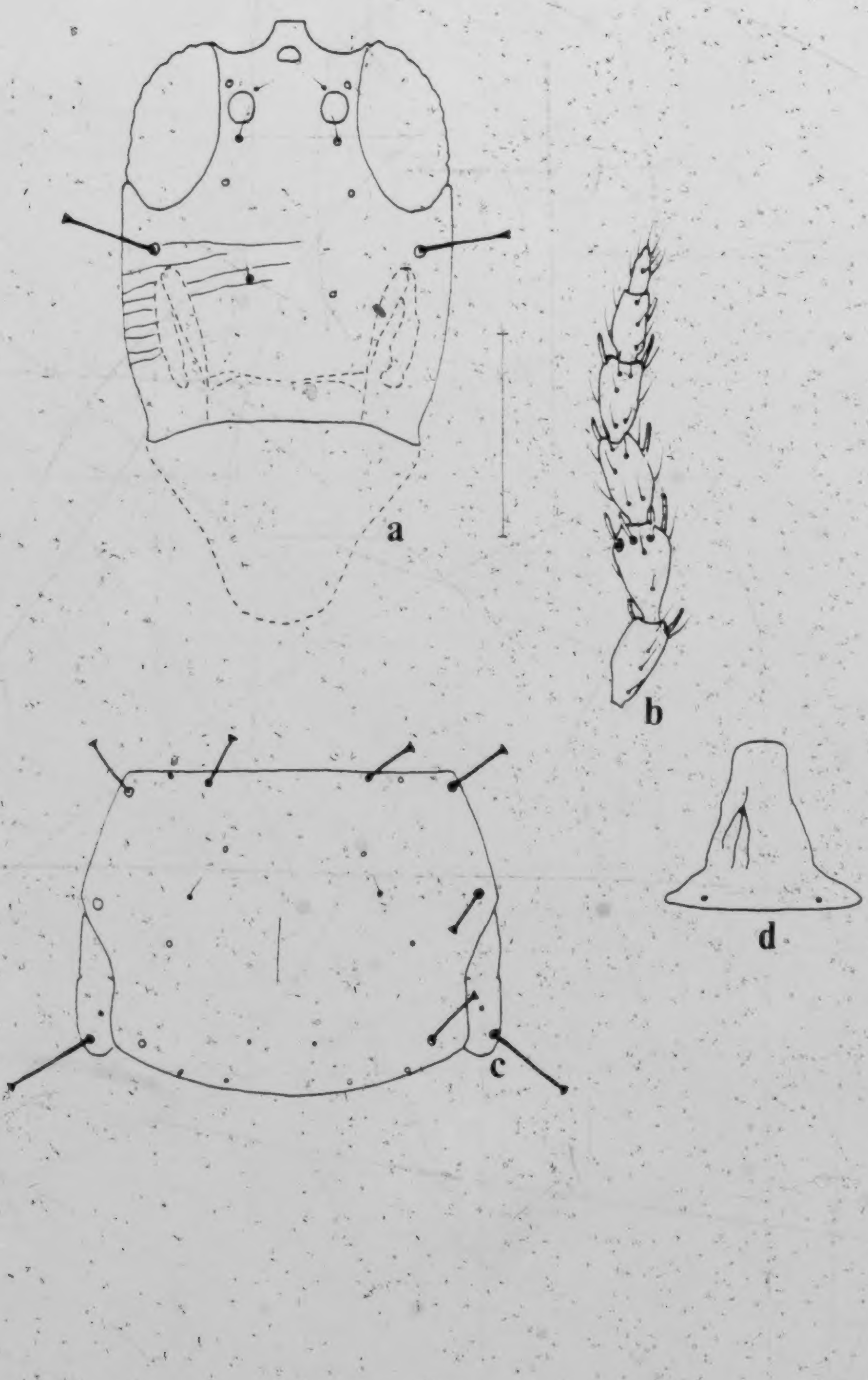


Fig. 90. *Karnyothrips expandosus*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta


a
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Pelta slender, bell-shaped, reticulate; pair of campaniform sensilla present (Fig. 90d). Abdominal tergites II to VII each with 2 pairs of curved wing retaining setae; B1 setae well developed, pale, with expanded apices. B1 setae of tergite IX about as long as tube, with pointed apices Tube conical; shorter than head. Anal setae well developed. Dimensions (holotype female; um) . Body length (extended) 2135.2. Head length 204, median width 163; dorsal eye length 68; postocular setae 44.2; antennal segments length: I 27.2; II 42.5; III 44.2; IV 51; V 44.2; VI 42.5; VII 35.7; VIII 23.8. Pronotum length 156.4, median width 200.6, major setae length: aa 32.3, am 25.5, ml 27.2, pa 37.4, ep 51. Tergite IX setae: B1 86.7, B2 28.9, B3 93.5. Tube length: 110.5.

Type data. **Holotype** female, PHILIPPINES: Bicol Experiment Station, Pili, Camarines Sur, on *Saccharum spontaneum*, 5-VI-1987, C.P.Reyes (**UPLB**). **Paratypes** (1 female, 2 males) same data as holotype (**UPLB**).

Male macroptera. Similar to female in in color and structure but body smaller. Pronotal major setae and B setae on tergite IX shorter.

Dimensions (allotype male; um). Body length (extended) 1387.2. Head length 176.8, median width 136; dorsal eye length 59.5; postocular setae 32.3; antennal segments length: I 23.8; II 37.4; III 37.4; IV 44.2; V 37.4; VI 35.7; VII 34; VIII 22.1. Pronotum length: 122.4, median width 156.4, major setae length: aa 17; am 17; ml 15.3; pa 23.8; ep 37.4. Tergite IX setae: B1 78.2; B2 18.7; B3 30.6. Tube length: 83.3.

Material examined. Type series only (**UPLB**).

Etymology. Expandosus is a Latin word meaning "expand or expanded" in reference to the expanded postocular and major pronotal setae of these thrips.

Distribution (Fig. 91). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Bicol Experiment Station, Pili, Camarines Sur.

Host. Most known members of *Karnyothrips* are predatory.

***Karnyothrips flavipes* (Jones)**
Anthrothrips flavipes Jones, 1912: 18-19.
Holotype female, U.S.A.: San Jose, California (**USNM**)[examined].

Diagnosis. Body brown. Body setae pale. Head longer than wide, slightly striate posteriorly. Postocular setae shorter than dorsal length of eyes, with expanded apices. Antennal segments III and IV with 2 and 4 sense cones respectively. Pronotal anteromarginal setae vestigial. All femora brown; foretarsi each with small tooth. Forewings pale, with duplicated cilia. Pelta triangular, with broad apex. Tube longer than head. This is the first record of *K. flavipes* in the Philippines.

Female macroptera. Head 1.5 to 1.8 times as long as wide; slightly constricted towards base; faintly striate posteriorly. Eyes and ocelli small. Postocular setae shorter than dorsal length of eyes, with expanded apices. Antennae generally brownish; segment III yellowish brown; segment IV brown, sometimes pale in basal third, broader than segment III; segment III and IV with 2 to 4 sense cones respectively. Mouthcone rounded.

Pronotum smooth; anteroangular setae conspicuous; anteromarginal setae vestigial; posteroangular and epimeral setae subequal. Femora brown; tibiae brownish yellow, apices paler; tarsi yellow; foretarsi each with small tooth. Forewings pale, each with 1 to 5 duplicated cilia; subbasal wing setae well developed, with expanded apices. Meso and metanota faintly reticulate.

Pelta triangular, with broad apex; reticulate; pair of campaniform sensilla present. Abdominal tergites II to VII each with 2 pairs of wing retaining setae; B1 setae of tergites II to V long, with expanded apices. B1 setae on tergite IX shorter than tube, with expanded apices. Tube conical, longer than head. Anal setae longer than tube.

Male macroptera. Similar to female in general structure and color but body smaller. Not yet known in the Philippines.

Material examined. 2 females, Manila, on *Ceraplastis sinensis*, 15-V-1964, N. Krauss (**BPBM**); 1 female, Pina, Guimaras, on "guyabano", 22-V-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 91). This species has a cosmopolitan distribution. In the Philippine Archipelago, this species is known from the islands of Luzon and Visayas.

PHILIPPINES: Luzon: Manila; Visayas: Pina, Guimaras.

Hosts. "guyabano", *Thea sinensis*, predators of Coccidae, Aleyrodidae and Acarina on a wide variety of plants. This species preys on Coccidae, Aleyrodidae and Acarina (Pitkin, 1976) and scale insects in the genera *Asterolecanium*, *Parlatoria*, and *Saissetia* (Lewis, 1973).

***Karnyothrips melaleucus* (Bagnall)**
Hindsiana melaleuca Bagnall, 1911a: 60-63.
Holotype female, Denmark: Copenhagen (**TMNH**) [examined].

Diagnosis. Body bicolored. Head, thorax, abdominal tergites VIII or IX and X brown, pelta and tergites II to VII or VIII yellow; tergites III to VII with small median transverse pale brown patch near anterior margin. Postocular setae longer than eyes, with expanded apices. Antennal segment III and IV with 2 and 3 sense cones. Mid and hindfemora yellow; foretarsi with small tooth. Forewings pale with 3 or more duplicated cilia. Pelta triangular. Tube shorter than head. This is the first record of *K. melaleucus* in the Philippines.

Female macroptera. Head longer than wide, slightly constricted towards base. Ocelli small. Eyes about .20 times as long as head. Postocular setae longer than eyes, with expanded apices. Cheeks nearly parallel-sided. Antennal segment I brown, segment II to V yellow, IV and V brownish towards apices; segment VI yellowish brown; segments VII and VIII brown; segment VII about 2 times as long as VIII; segment IV slightly wider than segment III; segments III and IV with 2 and 3 sense cones respectively. Mouthcone narrowly rounded.

Pronotal anteromarginal setae vestigial; posteroangular setae about as long as epimerals. Forefemora brown in basal half, yellow on apical half; mid and hindfemora, tibiae and tarsi yellow; foretarsi with small tooth. Forewings pale, with 3 or more duplicated cilia; subbasal wing setae well developed, pale, with expanded apices. Meso and metanota faintly reticulate.

Pelta triangular, with narrow apex, reticulate; pair of campaniform sensilla present. Abdominal tergites II to VII with 2 pairs of wing retaining setae. B1 setae of tergites II to VII well developed, pale, with expanded apices. B1 setae on tergite IX pointed or blunt apically, longer than tube. Tube conical, darker on basal half; shorter than head. Anal setae longer than tube.

Male macroptera. Similar to female in general structure and color but body smaller. Not yet known in the Philippines.

Material examined. 1 female, San Jose, [Occidental] Mindoro, host unknown, 10-I-1945, E. S. Ross (Moulton Coll.) (**CASC**); 1 female, Manila, on *Renanthera monachica*, 1938, T. F. Chong (**USNM**).

Distribution (Fig. 91). This species has a cosmopolitan distribution. In the Philippine Archipelago, this species is known from Luzon and Visayas. PHILIPPINES: Luzon: Manila; Visayas: San Jose, Mindoro.

Hosts. *Renanthera monachica*, *Dracaenae* sp., *Thea sinensis*, cruciferous flowers in palm house, wild grass, *Bambusa* sp., *Vanda* sp. This species lives on grasses, sometimes in association with scale insects (Pitkin, 1976). In the United States, members of this species are predatory on *Ceroplastes cirripediformis* (Lewis, 1973).

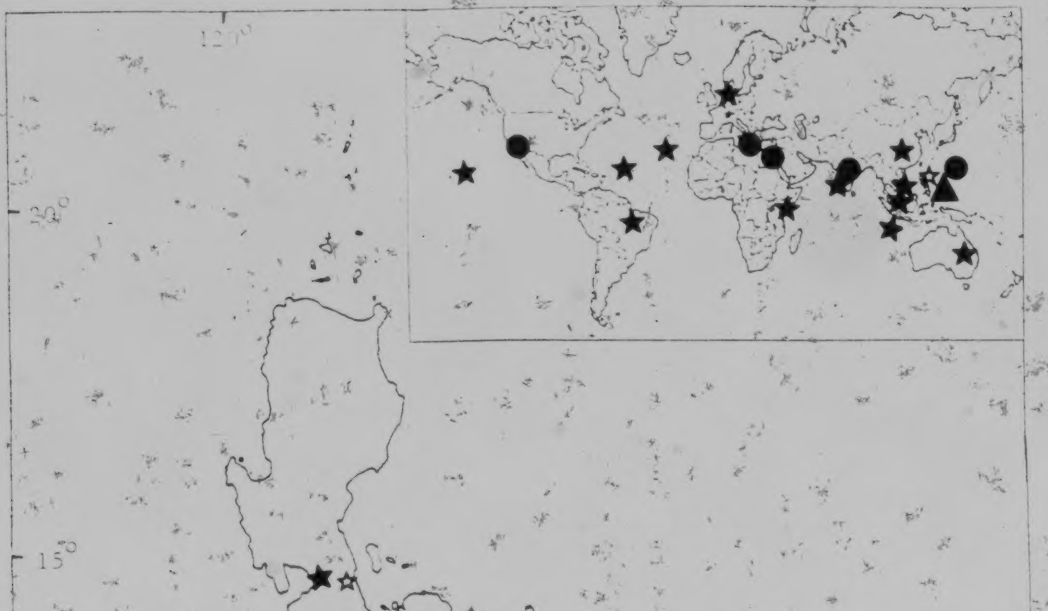
Fig. 91. Distribution of *Karnyothrips* species in the Philippines, and world.

☆ *K. ateuchis*, n. sp.

▲ *K. expandosus*, n. sp.

● *K. flavipes* (Jones)

★ *K. melaleucus* (Bagnall)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Genus *Leeuwenia* Karny

Leeuwenia Karny, 1912a: 161.
Type species: *Leeuwenia gladiatrix* Karny, by monotypy.

Diagnosis. Head reticulate and tuberculate, constricted behind eyes, widest towards base. Foreocellus on ocellar hump; ocellar setae pair III developed. Postocular setae present or absent, when present moderately long. Antennae 8- segmented; segment III with 1 sense cone; segment IV with 2 sense cones. Maxillary stylets retracted into head capsule; maxillary bridge absent. Mouthparts broadly rounded.

Pronotum reticulate and tuberculate; anteroangular setae present or absent; epimeral setae usually well developed and each on a raised tubercle. Legs reticulate to tuberculate; forefemora enlarged. Epimeral sutures incomplete. Praepectal plates small; mesopraesternum boat-shaped. Pterothorax broad; meso and metanota tuberculate. Forewings broad, parallel-sided without duplicated cilia.

Pelta broad, reticulate with pair of campaniform sensilla. Abdominal tergites reticulate, with stout setae. Tergites II -VII each with 2 pairs of lanceolate, wing retaining setae. Tergite IX with B1 setae short, expanded or knobbed at apex. Tube from 2.7 to 5.3 times as long as head; setose and with short to long lateral setae. Anal setae short.

Members of *Leeuwenia* are known mainly from the orient (Ananthakrishnan 1970). Adults of this species can be easily distinguished by their exceptionally long, setose tube; tuberculate and reticulate body and broad meso and metanota. Ananthakrishan (1970) reviewed the world species of *Leeuwenia* and provided a key to 11 species. About 13 species are included in this genus (Priesner, 1929a; Ananthakrishnan, 1970) of which *L. fimbiatrix* and and a new species, *L. arbastoae*, are known from the Philippines.

Key to Philippine species of *Leeuwenia* Karny

1 Antennal segments VII and VIII brown; postocular setae well developed (Fig. 92b); tube about 5 times as long as head .... *L. arbastoae*, n. sp.

1' Antennal segments VII and VIII yellow; postocular setae vestigial; tube about 4 times as long as head .... *L. fimbiatrix* Priesner

***Leeuwenia arbastoae*, n. sp.**
Holotype female, Philippines: Mindanao: Agko, Mt. Apo (**UPLB**)
Figure 92a, b, c, d

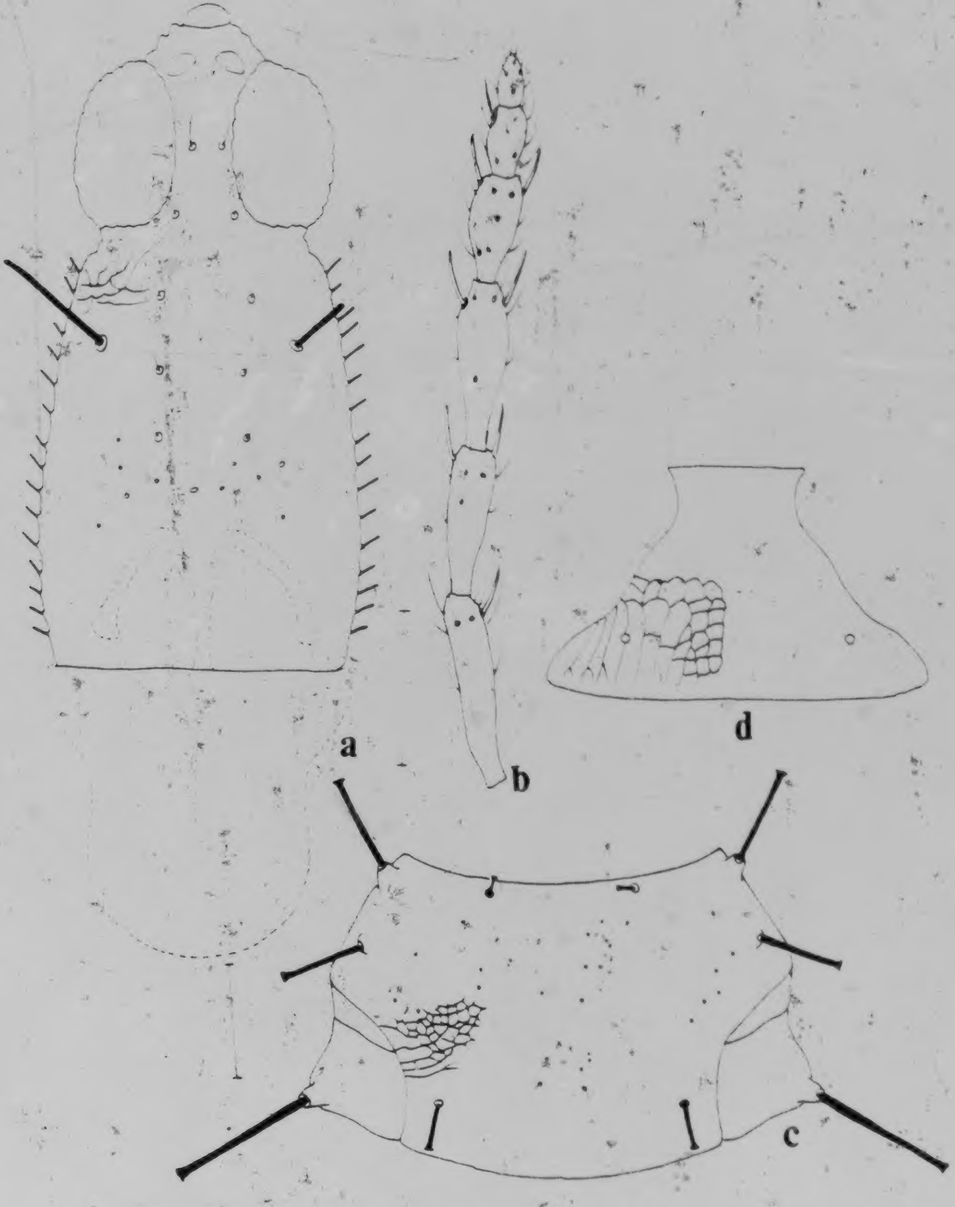
Diagnosis. Body brown. Body reticulate and tuberculate; setae pale, stout, with expanded apices. Head rectangular, deeply incut behind eyes. Postocular setae present and well developed, with blunt apices. Antennal segment III- VI yellowish; III nearly tubular in basal half, longer than segment IV; segments III and IV with 1 and 2 sense cones respectively. Major pronotal setae developed; anteroangular setae present; epimerals longest. Legs bicolored; foretarsi without tooth. Forewings pale, with out duplicated cilia. Pelta broad, flasked-shaped. B1 and B2 setae of tergite IX stout, with expanded apices. Tube with moderately developed lateral and median setae.

Adults of *L. arbastoe*, n. sp. resemble those of *L. karnyi* Fulmek in having developed postocular and pronotal anteroangular setae. This species can be easily distinguished from the latter by the following characteristics: larger body; cheeks deeply incut behind eyes; lateral and median setae on tube moderately developed; much longer head and tube; pronotal setae except marginals each on tubercle, and tergite IX with B1 setae with expanded apices.

Female macroptera. Head longer than wide, widest towards base; reticulate and tuberculate (Fig. 92a). Ocellar hump prominent. Postocellar setae long. Eyes protruding, about 0.20 times as long as head. Postocular setae stout, well developed, with blunt apices. Cheeks deeply incut eyes, with spines. Antennal segments I and II brown; III to VI yellowish; VII and VIII brown; III slender, tubular in basal half longer than segment IV; segment VII broad at base; segments III and IV with 1 and 2 sense cones respectively (Fig. 92b). Maxillary stylets retracted, about one-quarter of head length. Mouthcone elongate, basally rounded (Fig. 92a).

Pronotum reticulate and tuberculate; major setae well developed, slightly expanded apically; anteroangular setae present, longer than midlateral and posteroangular setae;

Fig. 92. *Leeuwenia arbastoae*, n. sp., female holotype: a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta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d

epimeral setae longest (Fig. 92c). Legs tuberculate and setose; femora brown; forefemora pale medially, slightly enlarged, with stout setae medially on outer margins; tibiae brown on basal 3 quarters, pale on apical quarter; foretibiae pale medially; tarsi yellowish brown; foretarsi without tooth. Forewings pale, without duplicated cilia; subbasal wing setae developed, with slightly expanded apices. Meso and metanota reticulate, with few tubercles.

Pelta broad, reticulate; pair of campaniform sensilla present (Fig. 92d). Abdominal tergites reticulate. Tergites II to VII each with 2 pairs of lanceolate, wing retaining setae; laterodorsal setae of tergites borne on large tubercles, pale, with knobbed apices; tergal lateral setae well developed, with blunt apices. Tergites VIII and IX with numerous accessory setae medially. B1 and B2 setae of tergite IX stout and short, B1 shorter than B2, with expanded apices. Tube almost 5.0 times as long as head, with moderately developed lateral and median setae. Anal setae short.

Dimensions (holotype female; um). Body length (extended) 5331.2. Head length 414.8, median width 217.6, dorsal eye length 112.2; postocular setae length 98.6; antennal segments length: I 61.2; II 68; III 125.8; IV 108.8; V 108.8; VI 81.6; VII 54.4; VIII 40.8. Pronotum length 261.8, median width 374, major setae length: aa 95.2, am 17, ml 71.4, pa 30.6, ep 125.8. Tergite IX setae: B1 57.8, B2 23.8, B3 67.3. Tube length: 2012.8

Type data. **Holotype** female, PHILIPPINES: Mindanao: Agko, Mt. Apo, on sweeping fern, 3-V-1987, A. Arbasto (**UPLB**)

Material examined. **Holotype** only (**UPLB**).

Etymology. This species is named after Amabel Arbasto who collected this interesting specimen.

Distribution (Fig. 93). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo.

Host. sweeping fern

Leeuwenia fimbiatrix Priesner

Leeuwenia fimbiatrix Priesner, 1929a: 447.
Syntype female, Philippines: Mt. Makiling, Laguna (**SMFG**)[examined]

Diagnosis. Body brown. Body setae pale. Head longer than wide, deeply incut behind eyes. Postocular setae vestigial. Antennal segments III to VIII yellow. Pronotal major setae reduced; anteroangular setae absent; epimeral setae prominent, with slightly expanded apices. Legs bicolored; foretarsi without tooth. Metanotum hexagonally reticulate. Abdominal tergites II to VII with 2 pairs of lanceolate-shaped wing retaining setae. Tube much longer than head; lateral and median setae well developed.

This species is known only from the the Philippines. Adults of this species differ from those of *L. arbastoae*, n. sp. in having a smaller body, shorter tube, vestigial postocular setae, and antennal segments VII and VIII yellow rather than brown.

Female macroptera. Head about 1.5 times as long as wide, deeply incut behind eyes; reticulate and tuberculate. Ocellar hump prominent. Eyes about one-third as long as head length. Postocular setae small. Cheeks with spines. Antennal segments I and II brown, II pale apically; III to VIII yellow; segments III and IV with 1 and 2 sense cones respectively. Maxillary stylets retracted about one-half of head length. Mouthcone broadly rounded.

Pronotum reticulate; major setae reduced; anteroangular setae minute; epimeral setae about 2.5 to 3.0 times as long as posteroangulars, slightly expanded at apices. Femora brown; forefemora moderately enlarged; foretibiae yellowish brown; mid and hindtibiae brown; tarsi pale. Forewing not spread out, difficult to see. Metanotum hexagonally reticulate; median setae slender.

Pelta broad, reticulate. Abdominal tergites II to VII distinctly reticulate laterally, with 2 pairs of lanceolate, wing retaining setae; posteromarginal and lateral setae well developed, each on tubercle. B1 setae of tergite IX shorter than B2, slightly expanded at apex. Tube about 3.8 to 4 times as long as head; pale; median and lateral setae spine-like;

lateral setae about 2.5 times as long as median setae. Anal setae short, about 0.5 times as long as lateral setae of tube.

Male. Unknown.

Material examined. 2 **Syntype** females, Philippines: Luzon: Mt. Makiling, Laguna, host unknown (**SMFG**).

Distribution (Fig. 93). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Mt. Makiling, Laguna.

Host. unknown

Genus *Leptoliothrips* Moulton

Leptoliothrips Moulton, 1927: 198
Type species: *Leptoliothrips manilae* Moulton, by original designation.

Diagnosis. Head longer than wide, with width subequal to that of pronotum. Vertex produced in front of eyes, bearing foreocellus. Ocelli and eyes large. Postocular setae developed. Antennae 8-segmented; segment III with 1 sense cone; IV with 2 sense cones. Mouthcone long, reaching anterior margin of mesosternum, sharply pointed.

Pronotum trapezoidal, with developed major setae. Forefemora greatly enlarged, about as long as head and half as wide as long; foretarsi each with tooth; mid and hindlegs long and slender. Forewings parallel-sided, with duplicated cilia.

Pelta ?triangular. Abdominal tergites II-VII with 2 pairs of wing retaining setae. Tube shorter than head.

Leptoliothrips is known only from the holotype male and the specimen is in poor condition. Moulton (1927) considered the representative of this genus to be related to *Liothrips* Uzel because of its pointed mouthcone and parallel-sided forewings and to *Leptothrips* in its swollen vertex of the head and in the shape of its antennal segments.

Leptoliothrips manilae **Moulton**
Leptoliothirps manilae Moulton, 1927: 199-200.
Holotype male, Philippines: Manila (CASC)[examined]

Diagnosis. Body brown. Body setae brownish. Head longer than wide; vertex produced in front of eyes. Ocelli and eyes large. Postocular setae developed, with blunt apices. Antennal segment III yellowish brown; segment III with 1 outer sense cone; IV with 1 inner and 1 outer sense cones. Mouthcone long and pointed. Pronotal major setae well developed, with expanded apices. Forefemora greatly enlarged; foretarsi each with tooth. Forewings pale, with duplicated cilia. Pelta triangular. Tube shorter than head. This species is known only from the holotype specimen.

Male macroptera. Head longer than wide; transversely striate. Vertex produced in front of eyes, bearing large foreocellus. Posterior ocelli large, touched inner margins of eyes. Eyes large, with small facets. Postocular setae developed, with blunt apices. Cheeks evenly and slightly arched from margin of eyes to posterior angles. Antennal segments I and II brown, II pale apically; III and IV light yellowish brown; VI to VIII brown, VI light basally; VII slightly longer than segment II; segment III with 1 outer sense cone; IV with 1 inner and 1 outer sense cones. Mouthcone long and pointed, extended to anterior margin of mesosternum.

Pronotum trapezoidal; lateral margins nearly straight, diverging evenly towards posterior margin; major setae developed, with expanded apices. Forefemora brown, greatly enlarged, about as long as head; foretibiae pale, shaded with dark brown on margins; foretarsi each with tooth. Forewings pale, slender, with 8 to 11 duplicated cilia.

Pelta triangular. Abdominal tergites II to VII each with 2 pairs of wing retaining setae. Tube about two-thirds as long as head, narrowed evenly in apical half. Anal setae well developed.

Female. Unknown.

Material examined. **Holotype** male, PHILIPPINES: Manila, on unknown plant, 1909, George Compare (Moulton Coll.) (**CASC**).

Distribution (Fig. 93). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Manila.

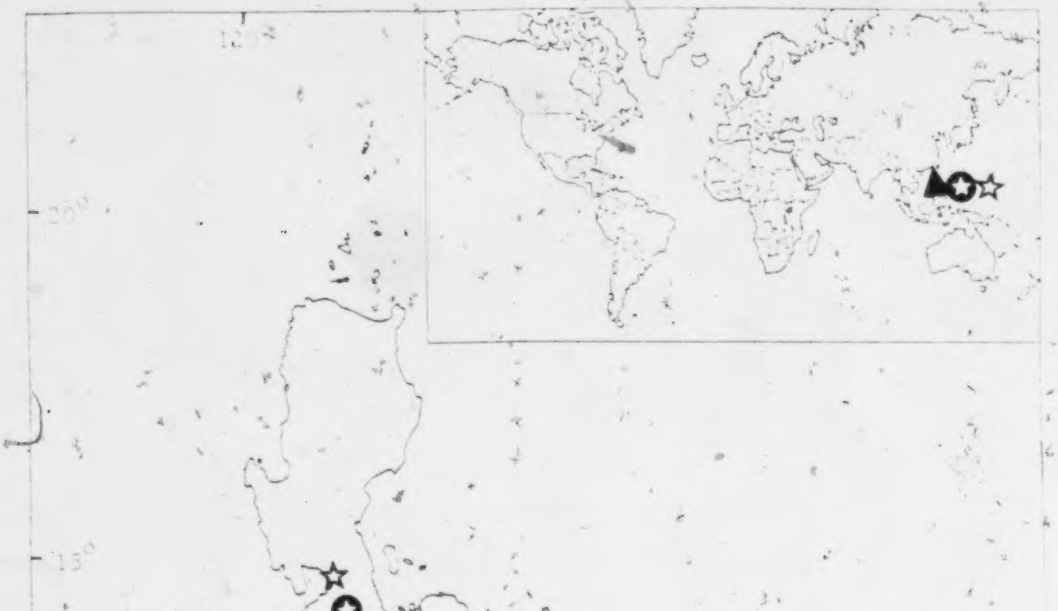
Host. unknown plant

Fig. 93. Distribution of *Leeuwenia* species and *Leptoliothrips manilae* Moulton in the Philippines.

▲ *Leeuwenia arbastoae*. n. sp

✪ *Leeuwenia fimbiatrix* Priesner

☆ *Leptoliothrips manilae* Moulton


120°
20°
15°
10°
125°

Genus *Liothrips* Uzel

Liothrips Uzel, 1895: 261.
Type species: *Phloeothrips setinodis* Reuter, by subsequent designation (Hood,1918).

Diagnosis: Head about as long as wide or longer, parallel-sided or gradually narrowed towards base, surface transversely striate. Vertex produced anteriad. Ocelli present; foreocellus reduced in brachypterous forms. Eyes moderate in size to moderately large. Postocular setae various in length, dilated, blunt or pointed at apex. Cheeks without any strong basal setae. Antennae 8-segmented; intermediate segments generally slightly elongate; segment III with 1 outer sense cone; segment IV elongate but subglobose in several species, always with 1 inner and 1 or 2 and sometimes with 3 outer sense cones; segment VIII nonpedicellate. Maxillary stylets retracted far into the head, nearly touching in middle of head. Mouthcone long, pointed to narrowly rounded.

Prothorax weakly sculptured to nearly smooth; with major setae developed; anterior setae smaller than posterior setae, apices pointed to blunt or expanded. Epimeral sutures complete. Praepectal plates absent. Metanotum longitudinally striate to hexagonally reticulate. Forelegs without tarsal tooth. Macroptera or brachyptera. Forewings parallel-sided, with duplicated cilia.

Pelta small, bell-shaped to triangular. Abdominal tergites II-VII each with 2 pairs of well developed wing retaining setae; sometimes weakly developed in brachypterous forms. Tergite IX with B1 setae pointed to blunt at apex. Males usually with broad glandular area on sternite VIII. Tube conical or slender, and short to moderately long.

The genus *Liothrips* includes about 200 known species worldwide (Mound and Houston, 1987). Members of almost all species are leaf feeders and of some cause leaf galls. The relationships of the genus to other genera are not well defined. Characters that are presently used to distinguish the members of this genus from those of related genera are: maxillary bridge absent; cheeks without spine-like setae; praepectal plates absent;

forefemora slender and foretarsi each without a tooth. Ten species of *Liothrips* are known from the Philippines.

Key to Philippine species of *Liothrips* Uzel

1 Head rectangular, broad beyond middle (Fig. 94a); intermediate antennal segments elongate and slender (Fig. 94b) .... *L. capitonis*, n. sp.

1' Head usually converging gradually towards base; intermediate antennal segments robust to moderately elongate and slender 2

2(1') Postocular and pronotal anteromarginal setae vestigial 3

2' Postocular and pronotal anteromarginal setae well developed 4

3(2) Antennal segment IV with 4 sense cones; forewings shaded with brown .... *L. spectator* Priesner

3' Antennal segment IV with 2 sense cones (Fig. 96b); forewings pale .... *L. leptum*, n. sp.

4(2') Antennal segment IV with 4 sense cones 5

4' Antennal segment IV with 2 or 3 sense cones 6

5(4) All tibiae and antennal segments V and VI yellow .... *L. pallicrus* Karny

5' All tibiae and antennal segment V and VI bicolored yellow and brown .... *L. orchidis* (Moulton)

6(4') All tibiae yellow; postocular setae well developed 7

6' Mid and hindtibiae brown or yellow only at apices; postocular setae short or well developed 9

7(6) Antennal segments elongate and slender; forewings each with 15 duplicated cilia .... *L. callosae* Priesner

7' Antennal segments moderately robust; forewings with 8 or 9 dupicated cilia 8

8(7') Head widest towards base (Fig. 95a); forewings pale ...... *L. helvutibia*, n. sp.

8' Head narrowed towards base; forewings brown .... *L. kuwanai* (Moulton)

9(6') Postocular setae short; mouthcone rounded .... *L. heptapleuri* (Karny)

9' Postocular setae developed; mouthcone nearly pointed
.... *L. chavicae* (Zimmermann)

Liothrips callosae Priesner
Liothrips callosae Priesner, 1968: 192.
Holotype female, Indonesia: Sebesie (**SMFG**) [examined].

Diagnosis. Body brownish black. Body setae dark. Head much longer than wide, constricted at base. Eyes protruded, more than one-third of head length. Postocular setae shorter than dorsal length of eyes, with blunt apices. Antennal segments elongate and slender; segments III to VI yellow. Pronotal major setae well developed, with blunt apices. Legs bicolored. Forewings shaded with light brown on apical half, with duplicated cilia. Pelta irregularly triangular. Tube shorter than head.

This is the first record of *L. callosae* in the Philippines. Members of this species are similar to those of *L. helvutibia*, n. sp. and *L. kuwanai* in having well developed postocular setae, yellow tibiae and pale forewings. *L. callosae* differ from both in the shape of antennal segments, and shape of pelta and mouthcone. Adults of this species are very similar to *L. gracilis* (Karny) adults known also in Indonesia but the former have a shorter head and their postocular, pronotal posteroangular and tergite IX B1 setae are longer (Priesner, 1968).

Female macroptera. Head more than 2.0 times as long as wide, constricted at base and transversely striate. Ocellar hump small. Ocelli large. Eyes protruded, and more than 0.35 times as long as head. Postocular setae shorter than dorsal length of eyes. Cheek setae fine. Antennae more than 2.0 times as long as head; segments I and II brown, II pale apically; III to VIII elongate; III more slender than segment IV; III to VI yellow; VII brown with pale base; VIII brown, constricted at base. Mouthcone nearly pointed.

Pronotum small, transverse, with faint reticulation; major setae developed, with blunt apices; anteromarginal setae slightly longer than anteroangulars; midlateral and posteroangular setae longer than epimerals. Femora brown; tibiae and tarsi yellow. Forewings pale in basal half, shaded with light brown in apical half, extreme base shaded;

12 to 14 duplicated cilia; subbasal wing setae developed, with knobbed apices. Metanotum longitudinally reticulate.

Pelta irregularly triangular, reticulate, with pair of campaniform sensilla. Abdominal tergites II to VII each with 2 pairs of wing retaining setae; lateral accessory setae numerous. B1 setae of tergite IX shorter than tube. Tube conical, dark brown basally, shorter than head. Anal setae shorter than tube.

Male. Unknown

Material examined. 4 females, UPLB, Laguna, on *Ficus* sp., 2-III-1985, Oratai and Chantana; 2 females, La Granja, La Carlota, Negros Occidental, on *Panicum maximum*, 16-V-1985, C. P. Reyes (**CPRC**).

Distribution (Fig. 97). The known range of this species extends from the Philippine to the Indonesian Archipelagoes. In the Philippines, this species is known from the islands of Luzon and Visayas. PHILIPPINES: Luzon: UPLB, Laguna; Visayas: La Granja, La Carlota, Negros Occidental. INDONESIA: Sebesie.

Hosts. *Ficus* sp., *Panicum maximum*, causing yellow spots on leaves of *Ficus callosa*

Liothrips capitonis, **n. sp.**
Holotype female, Philippines: Palawan: PNAC, Aborlan (**UPLB**)
Figure 94a, b, c, d

Diagnosis. Body large, brown. Head about twice as long as wide; surface covered with transverse striae. Postocular setae developed, with blunt apices. Antennal segments elongate and slender; segment III with 1 outer sense cone; IV with 1 inner and 1 outer sense cones. Pronotal major setae developed and expanded at apices. Legs bicolored. Forewings pale, with duplicated cilia. Pelta irregularly triangular. Tergal lateral setae well developed, with knobbed apices. Tube conical, shorter than head.

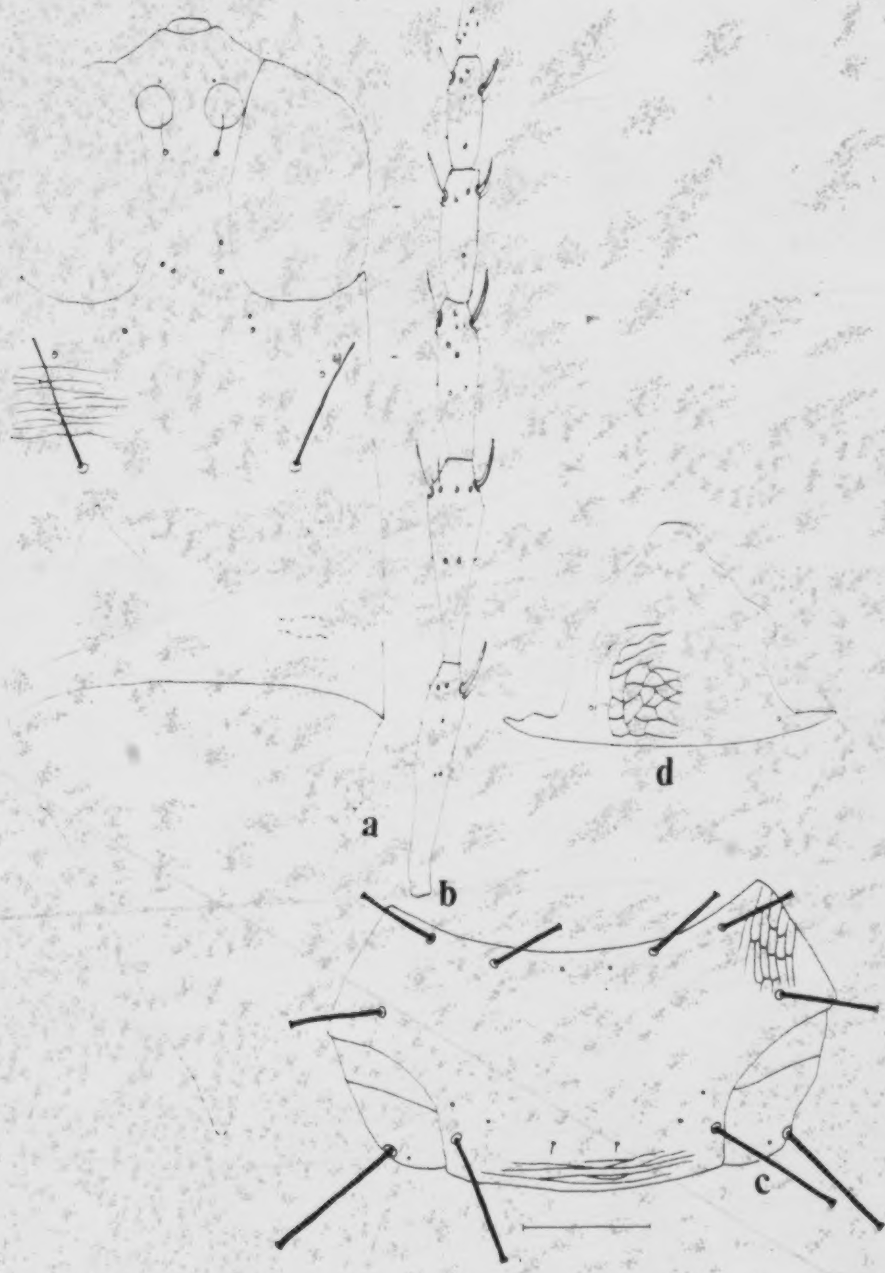
Unlike those of most species included in *Liothrips*, adults of this species have a very long head, very elongate and slender antennal segments, and a large body. This species is known only from the type material.

Female macroptera. Head rectangular; almost 2.0 times as long as wide, with closely spaced transverse striae (Fig. 94a). Ocellar area raised; ocelli large. Eyes about 0.35 times as long as head. Postocular setae shorter than eyes, with blunt apices. Antennae about 1.5 times as long as head; intermediate segments elongate, slender; segments I and II brown, II pale on apical half; III to VI yellow; VII yellow with greyish apex; VIII greyish brown; segment III elongate, longer than segment IV, with 1 outer sense cone; IV with 1 inner and 1 outer sense cones (Fig. 94b). Mouthcone pointed (Fig. 94a).

Pronotum transversely striate, with developed major setae; anteromarginal setae longer than anteroangulars; midlateral setae longer than anteromarginals; posteroangular slightly longer than epimerals (Fig. 94c). Femora brown; forefemora with pale apices; foretibiae yellow; mid and hindtibiae brown in basal quarter; tarsi yellow. Forewings pale, with 15 duplicated cilia; subbasal wing setae developed, with knobbed apices. Mesonotum with transversely anastomosed striae. Metascutum longitudinally striate.

Pelta irregularly triangular; reticulate, pair of campaniform sensilla present (Fig. 94d). Abdominal tergites reticulate laterally; accessory setae numerous; tergal lateral setae

Fig. 94. *Liothrips capitonis*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta


a
b
c
d

developed, with knobbed apices. Tergites II to VII each with 2 pairs of wing retaining setae, those on tergite VII minute. B1 setae of tergite IX about as long as tube, with blunt apices. Tube conical, shorter than head. Anal setae developed.

Dimensions (holotype female; um). Body length (extended) 3631.2. Head length 421.6, median width 248.2, dorsal eye length 132.6; postocular setae length 95.2; antennal segments length: I 59.5; II 66.3; III 151.3; IV 134.3; V 108.8; VI 90.1; VII 71.4; VIII 40.8. Pronotum length 238, median width 421.6, major setae length: aa 57.8, am 60.4, ml 100.3, pa 112.2, ep 110.5. Tergite IX setae: B1 197.2, B2 37.4, B3 11.9.

Type data. Holotype female, PHILIPPINES: Palawan: PNAC, Aborlan, on leaf of *Sandoricum koetjape*, 26-I-1985, C. P. Reyes (**UPLB**)

Male. unknown

Material examined. Holotype only (**UPLB**).

Etymology. Capitonis is a Latin word meaning "large or long head".

Distribution (Fig. 97). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Palawan. PHILIPPINES: Palawan: PNAC, Aborlan.

Host: leaf of *Sandoricum koetjape*

***Liothrips chavicae* (Zimmermann)**
Mesothrips chavicae Zimmerman, 1900: 6-19.
Holotype female, Indonesia: Java (**SMFG**) [examined]
Gynaikothrips chavicae Zimmermann; Uichanco, 1919: 548.

Diagnosis. Body blackish brown to black. Body setae dark. Head longer than wide. Eyes about one-third as long as head. Postocular setae about as long as dorsal length of eyes, with knobbed apices. Antennal segment III vasiform, longer than segment IV. Pronotal major setae developed, with knobbed apices. Legs generally brown, with pale tarsi. Forewings pale, with duplicated cilia; extreme base yellowish brown. Pelta irregularly triangular. Tube longer than head.

This species is most closely related to *L. retrofracti* Priesner and *L. soembanus* Priesner which are known in Indonesia and Indochina respectively (Priesner, 1970).

Female macroptera. Head about 1.4 times as long as wide; transversely striate. Ocellar hump small. Ocelli large. Eyes about one- third as long as head. Postocular setae about as long as dorsal length of eyes, with blunt apices. Cheek setae fine. Antennae about 1.5 times as long as head; I and II brown; III to VI pale yellow; III vasiform, longer than IV; VII and VIII brown, VII with pale base. Mouthcone nearly pointed.

Pronotal major setae developed; anteroangular setae longer than anteromarginals, with blunt to nearly pointed apices; epimeral setae developed, with knobbed apices. Femora dark brown; foretibiae yellowish brown; mid and hindtibiae brown, with pale apices; tarsi yellowish brown. Forewings faintly shaded with yellow; 11 to 13 duplicated cilia; subbasal wing setae developed, knobbed apically; setae S3 longest. Metanotum longitudinally striate.

Pelta irregularly triangular, reticulate; pair of campaniform sensilla present. Abdominal tergites reticulate laterally; accessory setae few. Tergites II to VII each with 2 pairs of wing retaining setae. B1 setae of tergites IX about as long as tube. Tube evenly conical, with pale apex, longer than head. Anal setae shorter than tube.

Male macroptera. Similar to female in general color and structure but smaller.

Material examined. 1 male, Bago-Oshiro, Davao City, on flower of Araceae, 2-III-1985, C. P. Reyes (**CPRC**).

Distribution (Fig. 97). The known range of this species extends from Thailand to the Indonesia Archipelago. In the Philippines, this species is known from the island of Mindanao. PHILIPPINES: Philippine Is.; Mindanao: Bago-Oshiro, Davao City. INDONESIA. THAILAND.

Hosts. *Piper loheri*, flower of Araceae, *Chavica densa*, *Melastoma polyanthum*, leaf of *Piper* sp. *L. chavicae* produce galls on leaves of *Piper loheri* in Los Banos, Laguna (Uichanco, 1919).

***Liothrips helvutibia*, n. sp.**
Holotype female, Philippines: Visayas: Mambucal, Murcia, Negros Occ. (**UPLB**)
Figure 95a, b, c, d

Diagnosis. Body brown. Body setae brownish. Head widened towards base. Postocular setae longer than dorsal length of eyes, with blunt apices. Antennal segment III with 1 outer sense cone; IV with 1 inner and 1 outer sense cones. Pronotal major setae developed with blunt apices. Legs bicolored. Forewings pale, with dark, median, longitudinal stripe and duplicated cilia. Pelta broadly triangular. Tube conical, shorter than head.

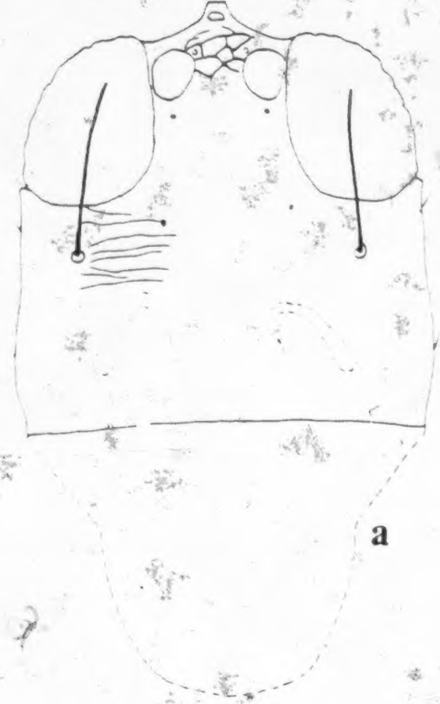
This species is similar to *L. kuwanai* and *L. pallicrus* in having well developed postocular setae and yellow tibiae and tarsi. *L. helvutibia* differ from both by the following characteristics: head widened towards base; forewings pale; postocular setae with blunt apices, and by the shape of antennal segments and pelta. This species is known only from the type material.

Female macroptera. Head longer than wide, widest towards base; transversely striate (Fig. 95a). Ocellar hump small. Ocelli large; posterior ocelli touched inner margins of eyes. Postocular setae longer than eyes, blunt apically. Antennal segments I and II brown, II with pale apex; III to VI yellowish; VII to VIII greyish brown; segment III with 1 inner sense cone; IV with 1 inner and 1 outer sense cones (Fig. 95b). Mouthcone elongate, rounded (Fig. 95a).

Pronotum transversely striate; major setae developed, blunt apically; epimeral setae longer than posteroangulars (Fig. 95c). Femora brown; tibiae and tarsi yellow. Forewings pale, with a dark, median, longitudinal stripe; 8 duplicated cilia; subbasal wing setae well developed, knobbed apically. Metascutum longitudinally striate.

Pelta broadly triangular; reticulate; a pair of campaniform sensilla present (Fig. 95d). Abdominal tergites reticulate laterally; tergal lateral setae well developed, with blunt apices. Tergites II to VII each with 2 pairs of wing retaining setae. B1 setae of tergite IX a

Fig. 95. *Liothrips helvutibia*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta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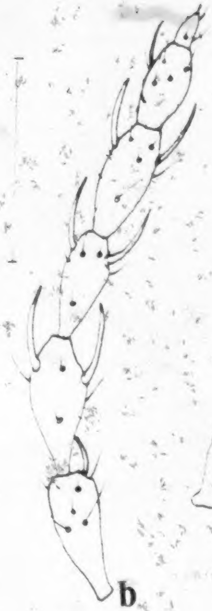
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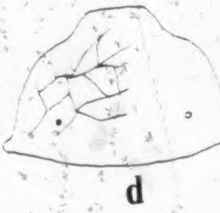
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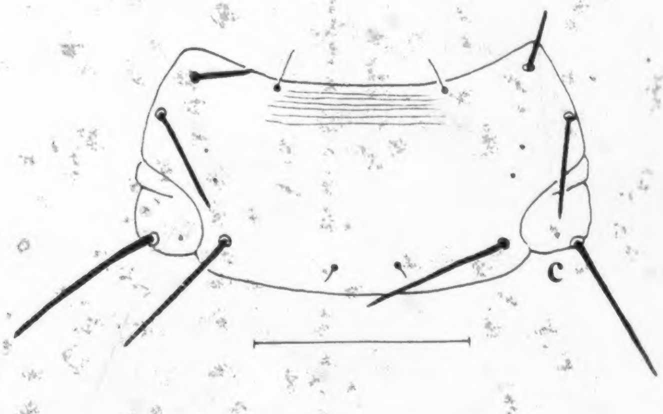

c

little longer than tube, pointed apically. Tube conical, shorter than head. Anal setae well developed.

Dimensions (holotype female; um). Body length (extended) 1706.8. Head length 214.2, median width 193.8; dorsal eye length 88.4; postocular setae 86.7; antennal segments length: I 27.2; II 49.3; III 64.6; IV 68; V 59.5; VI 56.1; VII 45.9; VIII 37.4. Pronotum length 108.8, median width 224.4, major setae: aa 27.2, am 27.2, ml 56.1, pa 61.2, ep 86.7. Tergite IX setae length: B1 175.1, B2 28.9, B3 180.2. Tube length 180.2.

Type data. Holotype female, PHILIPPINES: Visayas: Mambucal, Murcia, Negros Occidental; host unknown, 13-V-1985, C. P. Reyes (**UPLB**).

Male. Unknown.

Material examined. Holotype only (**UPLB**).

Etymology. Helvutibia is from the Latin helvus and tibia meaning yellow shinbone and refers to the yellow tibiae of adult of this thrips.

Distribution (Fig. 97). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Mambucal, Murcia, Negros Occidental.

Host. unknown.

Liothrips heptapleuri (Karny)

Gynaikothrips chavicae var *heptapleuri* Karny, 1913b: 109.
Holotype female, Indonesia: Solatiga, Java (**SMFG**)[examined]
Gynaikothrips chavicae var *heptapleuri* Karny; Uichanco, 1919: 549.

Diagnosis. Body black. Body setae dark except those on tergite IX paler. Head longer than wide, transversely striate. Postocular setae short, with blunt apices. Antennal segments III to VIII pale yellow. Pronotal major setae developed, with knobbed apices. Legs bicolored. Forewings brownish, with dark, median, longitudinal stripe and duplicated cilia. Pelta irregularly triangular. B1 setae of tergite IX with slightly dilated apices.

Female macroptera. Head longer than wide; transversely striate, with minute dark setae; slightly constricted at base. Ocelli and eyes moderately developed. Postocular setae short, with blunt apices. Cheeks nearly parallel-sided, with fine setae. Antennal segments I and II brown; III to VIII pale yellow; VIII rarely shaded with brown; III and IV with moderately long sense cones. Mouthcone rounded.

Pronotum transverse, faintly reticulate; major setae developed, knobbed apically; anteroangular setae longer than anteromarginals; posteromarginal and epimeral setae developed. Forewings faintly shaded with brown, with dark, median, longitudinal stripe not well defined; 9 to 15 duplicated cilia; subbasal wing setae developed, knobbed apically. Metanotum longitudinally reticulate.

Pelta irregularly triangular. Abdominal tergites II to VII each with 2 pairs of wing retaining setae. B1 setae of tergite IX with slightly dilated apices, longer than B2; B2 setae pointed at apices. Tube conical , strongly tapered in apical quarter. Anal setae developed.

Male macroptera. Similar to female in color and general structure. Forefemora larger. B2 setae of abdominal tergite IX vary in length, shorter than B1 and B3.

Material examined. I was not able to locate the specimens reported by Uichanco (1919) from the Philippines. Only the type material from Indonesia were examined.

Distribution (Fig. 97). The known range of this species extends from Japan to the Indonesia Archipelago. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: Los Banos, Laguna. INDONESIA: Java. Sumatra. JAPAN.

Hosts. leaf galls on *Schefflera odorata*, leaf galls on *Schefflera elliptica*, horn galls on *Schefflera* sp. Members of this species produce galls on leaves of *Schefflera odorata* in Los Banos (Uichanco, 1919).

Liothrips kuwanai (Moulton)
Gynaikothrips kuwanai Moulton, 1928b: 308.
Holotype female, Taiwan: Taihoku (**CASC**)[examined].
Gynaikothrips piperis Priesner, 1930a: 265.

Diagnosis. Body dark brown. Body setae pale. Head longer than wide. Ocelli and eyes large. Postocular setae longer than dorsal length of eyes, nearly pointed at apex. Antennal segments III to VI clear yellow, III vasiform, smaller than segment IV. Pronotal major setae well developed, with blunt apices. Femora brown; tibiae and tarsi yellow. Forewings pale at base and apex. Pelta irregularly triangular. Tube shorter than head.

Members of *L. kuwanai* are similar to *L. pallicrus* in having well developed postocular setae, yellow tibiae and shaded forewings. *L. pallicrus* differ from the former in having 4 sense cones on antennal segment IV and by the shape of antennal segments and pelta. Adults of *L. kuwanai* are difficult to distinquished from those of *L. pallipes* Karny. Priesner (1968) suspected that *L. kuwanai* is a biological race of the latter. *L. pallipes* is known in India, Indonesia and Malaysia and they also produce galls on leaves of *Piper* spp. Zur Strassen (1983) synonymized *G. piperis* Priesner, which was described from the Philippines, as a junior synonym of *L. kuwanai*.

Female macroptera. Head 1.1 to 1.5 times as long as wide; constricted towards base; transversely striate. Ocellar hump prominent. Ocelli and eyes large. Postocular setae well developed, longer than dorsal length of eyes, pointed apically. Cheeks slightly arched, with fine setae. Antennae about 1.8 times as long as head; segments I and II dark brown; III to VI clear yellow; III vasiform and smaller than IV; VII and VIII brown. Mouthcone rounded.

Pronotum transverse, faintly reticulate; major setae developed, blunt apically; anteromarginal setae longer than anteroangulars; epimeral setae slightly longer than posteroangulars. Femora brown; tibiae and tarsi yellow; forefemora slightly enlarged. Forewings shaded with light brown at base, with dark, median, longitudinal stripe on basal three-quarters; apical quarter clear; 8 to 9 duplicated cilia; subbasal wing setae developed, knobbed apically. Metanotum longitudinally reticulate.

Pelta irregularly triangular, reticulate; pair of campaniform sensilla present. Abdominal tergites laterally reticulate; accessory setae several. B1 setae of tergite IX developed, slightly longer than tube, with pointed apices. Tube about 0.75 times as long as head; conical; dark brown basally. Anal setae developed.

Male macroptera. Similar to female in color and structure but body smaller.

Material examined. 6 females, UPLB, Los Banos, Laguna, on *Piper betle*, 19-I-1982, J. Balatibat; 3 females, 6 males, Makiling Botanical Garden, Los Banos, Laguna, on unknown vine, 4-VII-1987, C. P. Reyes; 1 female, Sagpangan, Agko, Mt. Apo, on leaves of *Sarcocephalus* sp., 5-V-1987, C. P. Reyes (**CPRC**); **Syntypes** female and male of *Gynaikothrips piperis* Priesner, Los Banos, Luzon on *Piper loheri*. (**SMFG**).

Distribution (Fig. 97). The known range of this species extends from Japan to Indonesia Archipelago and Bonerati Island. In the Philippines, this species is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: UPLB, Los Banos, Laguna; Makiling Botanical Garden; Mindanao: Agko, Mt. Apo. INDONESIA: Java. TAIWAN. JAPAN. BONERATE IS.

Hosts. *Piper betle*, *Piper loheri*, unknown vine, leaves of *Sarcocephalus* sp., *Piper kadzura*, *Piper futokadsura*, *Piper recurvum*, *P. muricatum*, *Amilax* spp.

***Liothrips leptum*, n. sp.**
Holotype female, Philippines: Mindanao: Mlang, North Cotabato (**UPLB**)
Figure 96a, b, c, d

Diagnosis. Body brown. Ocellar hump prominent. Ocelli and eyes large. Postocular setae minute. Antennal segments slender; segment III with 1 outer sense cone; IV with 1 inner and 1 outer sense cones. Pronotal major setae reduced, with blunt apices; anteromarginal setae vestigial. Legs bicolored. Forewings pale, with duplicated cilia. Pelta triangular. Tube shorter than head.

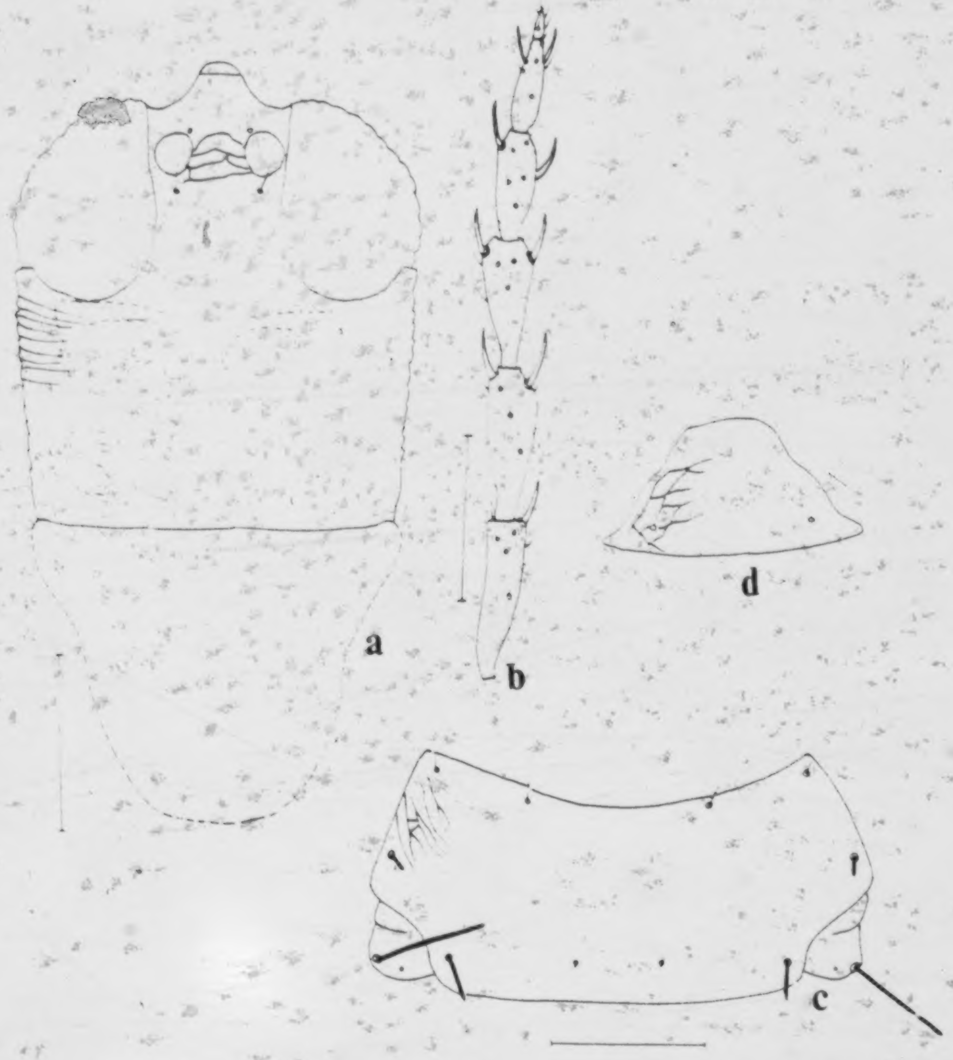
This species is similar to *L. spectator* in having vestigial postocular and pronotal anteromarginal setae, and slender antennal segments. *L. leptum*, n. sp. differ from the latter by the following characteristics: antennal segment IV with 1 inner and 1 outer sense cones; antennal segments III to VIII yellow; forewings pale, and all tibiae brown with pale apices.

Female macroptera. Head longer than wide; transversely striate (Fig. 96a). Ocellar hump prominent. Ocelli large. Eyes large, protruded. Postocular setae minute to vestigial. Antennal segments slender; segments I and II brown, II pale apically; III to VIII yellow; segments III with 1 outer sense cone; IV with 1 inner and 2 outer sense cones (Fig. 96b). Mouthcone rounded (Fig. 96a).

Pronotum transversely striate; major setae reduced, with blunt apices; anteromarginal setae vestigial; epimeral setae longer than posteroangulars (Fig. 96c). Femora brown; tibiae brown, pale apically with a long a seta on outer margin towards apex; tarsi yellow. Forewings pale, with 9 to 11 duplicated cilia; subbasal wing setae developed. Mesonotum transversely reticulate. Metascutum longitudinally reticulate.

Pelta triangular, reticulate; pair of campaniform sensilla present (Fig. 96d). Abdominal tergites reticulate laterally; tergal lateral setae developed, with knobbed apices. Tergites II to VII each with 2 pairs of stout wing retaining setae; anterior pair short,

Fig. 96. *Liothrips leptum*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta


a
b
d
c

slightly curved; posterior pair long, curved. B1-setae of tergite IX shorter than tube, with pointed apices. Tube shorter than head. Anal setae well developed.

Dimensions (holotype female; um). Body length (extended) 2346. Head length 268.6, median width 204, dorsal eye length 115.6; antennal segments length: I 47.6; II 59.5; III [illegible].9; IV 91.8; V 74.8; VI 57.8; VII 47.6; VIII 34. Pronotum length 120.7, median width 295.8, major setae: ml 20.4, pa 42.5, ep 64.6. Tergite IX setae: B1 153; B2 25.5; B3 170. Tube length: 204.

Type data. **Holotype** female, PHILIPPINES: Mindanao: Mlang, North Cotabato, on leaves with galls of *Mangifera indica*, 17-II-1985, C. P. Reyes (**UPLB**). **Paratypes** (1 female, 3 males) same data as holotype (**UPLB**).

Male macroptera. Similar to female in color and structure but body smaller. Pronotal posteroangular and epimeral setae shorter, B2 setae on tergite IX longer.

Dimensions (allotype male; um). Body length (extended) 1700. Head length 238, median width 200.6, dorsal eye length 102; antennal segments length: 37.4; II 51; III 85; IV 81.6; V 68; VI 61.2; VII 47.6; VIII 34. Pronotum length 105.4, median width 258.4, major setae: ml 23.8, pa 20.4, ep 47.6. Tergite IX setae: B1 129.2; B2 57.8; B3 153. Tube length: 163.2.

Material examined. Type series. Other. 1 female, 3 males, Bago-Oshiro, Davao City, on leaves with galls of *Mangifera indica*, 3-III-1985, C. P. Reyes (**UPLB**).

Etymology. Leptum is a Greek word meaning "slender" or "thin" which refers to the antennal segments of these thrips.

Distribution (Fig. 97). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Mindanao. PHILIPPINES: Mindanao: Mlang, North Cotabato; Bago-Oshiro, Davao City.

Host. This species produce galls on leaves of mango plants in Southern Mindanao.

Liothrips orchidis (Moulton)
Gynaikothrips orchidis Moulton, 1927: 200-201.
Holotype female, Philippines: Manila (CASC)[examined]

Diagnosis. Body dark brown. Body setae dark. Head longer than wide, transversely striate. Postocular setae developed, with pointed apices. Antennal segments III and IV yellow, slightly shaded with brown on apical third. Pronotal major setae developed, with pointed apices. Legs bicolored. Forewings light brown, darker along margins, with dark median, longitudinal stripe and duplicated cilia. Pelta irregularly triangular. Tube shorter than head.

This species is known only from the holotype specimen. Members of *L. orchidis* resembles those of *L. pallicrus* and *L. spectator* in having 4 sense cones on antennal segment IV and shaded forewings. This species differ from both by the following characteristics: shape of antennal segments; body setae with pointed apices; tibiae bicolored yellow and brown, and forewings with more duplicated cilia.

Female macroptera. Head longer than wide; transversely striate; vertex produced in front of eyes. Ocellar hump prominent. Ocelli and eyes moderately developed. Postocular setae developed, with pointed apices. Cheeks slightly rounded towards base. Antennal segments I and II dark brown; III and IV yellow, lightly shaded with brown on apical third; V yellow, greyish brown on apical third; VI yellow at base; VII and VIII brown; segments III with 1 outer sense cone; IV with 4 sense cones. Mouthcone rounded.

Pronotum transverse, rounded posteriorly, faintly reticulate; major setae developed, pointed apically; anteromarginal setae longer than anteroangulars; midlateral setae longer than anteromarginals; posteroangular setae longest. Femora brown; foretibiae yellowish at extreme base and on apical two fifths; mid and hindtibiae brown, yellowish at extreme apices; tarsi yellow. Forewings shaded with light brown, darker along margins; with dark median, longitudinal stripe, gradually fading towards apex; 14 duplicated cilia. Metanotum longitudinally reticulate.

Pelta irregularly triangular; reticulate. Abdominal tergites II to VII each with 2 pairs of sigmoidal, wing retaining setae; tergal lateral setae developed, with pointed apices. B1 setae on tergite IX developed, with pointed apices. Tube shorter than head. Anal setae developed.

Male. Unknown.

Material examined. **Holotype** female, PHILIPPINES: Luzon: Manila, on orchids (Moulton Coll.) (**CASC**).

Distribution (Fig. 97). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. PHILIPPINES: Luzon: Manila.

Host. orchids.

***Liothrips pallicrus* (Karny)**
Gynaikothrips pallicrus Karny, 1923: 315.
Holotype female, Indonesia: Blatgolle (**SMFG**)[examined]
Gynaikothrips pallicrus (Karny); Priesner, 1926: 173, 183.

Diagnosis. Body black brown. Body setae dark. Head longer than wide, constricted at base. Eyes large. Postocular setae developed, with expanded apices. Antennal segments III and IV pale yellow, with 1 and 4 sense cones respectively. Pronotal major setae developed, with blunt apices. Femora brown; tibiae and tarsi yellow. Forewings light brown, with dark, median, longitudinal stripe. Pelta irregularly triangular.

This species is similar to *L. orchidis* and *L. spectator* in having 4 sense cones on antennal segment IV, and shaded forewings. *L. pallicrus* differ from both by the following characteristics: shape of antennal segments and pelta; postocular setae well developed with expanded apices, and head constricted at base.

Female macroptera. Head longer than wide, transversely striate; distinctly constricted at base. Ocelli and eyes large. Postocular setae developed, with expanded apices. Cheeks narrower towards base, with fine setae. Antennal segments slender; segments III and VI pale yellow; segments III with 1 outer sense cone; IV with 4 slender sense cones; VII pale at base, shaded with greyish brown apically; VIII greyish brown, broad at base. Mouthcone rounded.

Pronotum transverse, slightly reticulate; major setae developed, with blunt apices; epimeral setae longer than posteroangulars. Femora brown; tibiae and tarsi pale yellow. Forewings slightly shaded with brown, with dark, median, longitudinal stripe; 8 to 12 duplicated cilia; subbasal wing setae developed, dark, with blunt apices. Metanotum longitudinally reticulate.

Pelta irregularly triangular, reticulate. Abdominal tergites II to VII each with 2 pairs of wing retaining setae. B1 setae of tergite IX about as long as tube or shorter, with pointed apices. Tube evenly conical in shape. Anal setae developed.

Male macroptera. Similar to female in color and structure but body smaller.

Material examined. I was not able to locate the specimen reported by Priesner (1926) from the Philippines.

Distribution (Fig. 97). The known range of this species extends from India eastward in the Philippines to Indonesia Archipelago. PHILIPPINES. INDONESIA: Blatgolle; South of Sulawesi. INDIA.

Hosts. leaf galls of *Vitis lanceolaria*, leaf galls of *Pothos scandens*

Liothrips spectator Priesner
Liothrips (*Phaenothrips*) *spectator* Priesner, 1968: 195.
Holotype female, Philippines: Mt. Makiling, Laguna (**SMFG**) [examined]

Diagnosis. Body brown. Body setae brown. Head longer than wide. Postocular setae vestigial. Antennal segments elongate, slender; segment IV much longer than III. Pronotal anteromarginal setae vestigial. Femora brown; tibiae and tarsi yellow. Forewings brownish, with dark, median, longitudinal stripe, with duplicated cilia. Pelta irregularly triangular. Tube shorter than head.

Members of this species are similar to those *L. orchidis* and *L. pallicrus* in having 4 sense cones on antennal segment IV, and shaded forewings. *L. spectator* differ from both in having vestigial postocular and anteromarginal setae, elongate and slender antennal segments, and setiform, long sense cones on segments III and IV. This species is known only from the Philippines.

Female macroptera. Head 1.8 to 2.0 times as long as wide, transversely striate; transversely striate. Ocellar hump small; ocelli large. Eyes about 0.35 times as long as head. Postocular setae vestigial. Antennal segments elongate, slender; segments III and IV pale yellow, with 1 and 4 long, setiform sense cones respectively; IV longer than III; VI yellow basally, brownish apically; VII yellow on basal half, greyish on apical half; VIII pale grey, with broad base. Mouthcone rounded.

Pronotum transverse; slightly reticulate; anteromarginal setae vestigial; posteroangular and epimeral setae developed, blunt apically. Femora generally brown; forefemora with pale apices; tibiae and tarsi yellow. Forewings shaded with brown, with dark, median, longitudinal stripe; 6 to 13 duplicated cilia; subbasal wing setae developed, with blunt apices. Metanotum longitudinally reticulate.

Pelta irregularly triangular. Abdominal tergites reticulate laterally. Tergites II to VII each with 2 pairs of wing retaining setae. B1 setae of tergite VII moderately developed, with expanded apices. B1 and B2 setae of tergite IX, shorter than tube, with pointed apices. Tube evenly conical, shorter than head. Anal setae developed.

Male macroptera. Similar to female in general structure and color but smaller.

Material examined. 1 female, Mt. Kitanglad, Bukidnon, on Rubiaceae, 26-V-1984, S. G. Reyes (**CPRC**); **Holotype** female, Mt. Makiling, Laguna, host unknown, C. F. Baker (**SMFG**).

Distribution (Fig. 97). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: Mt. Makiling, Laguna; Mindanao: Mt. Kitanglad, Bukidnon.

Host. Rubiaceae

Fig. 97. Distribution of *Liothrips* species in the Philippines, and world.

★ *L. callosae* Priesner

▲ *L. capitonis*, n. sp.

✪ *L. chavicae* (Zimmermann)

⬤ *L. helvutibia*, n. sp.

☆ *L. heptapleuri* (Karny)

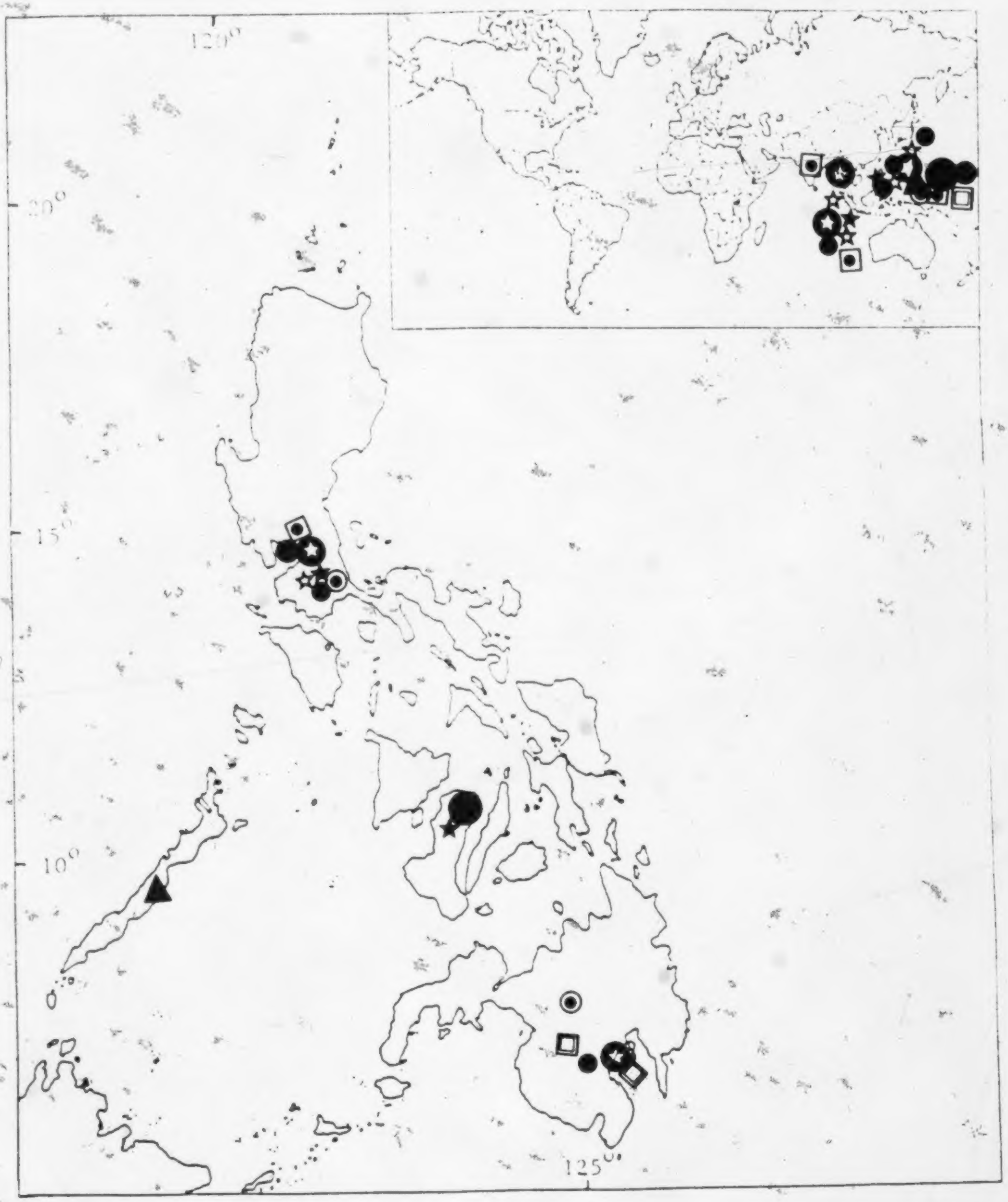
● *L. kuwanai* (Moulton)

▣ *L. leptum*, n. sp.

● *L. orchidis* (Moulton)

⊡ *L. pallicrus* (Karny)

◉ *L. spectator* Priesner


120°
20°
15°
10°
125°

Genus *Lizalothrips* Okajima
Lizalothrips Okajima, 1984: 729.
Type species: *Lizalothrips luzonensis* Okajima, by original designation

Diagnosis. Head longer than wide; eyes well developed. Antenna 8-segmented, long and slender. Maxillary stylets narrow, long, retracted into head; maxillary bridge slightly developed. Mouth cone short and rounded.

Pronotal chaetotaxy very similar to that of *Apelaunothrips* species; major setae well developed, with expanded apices; anteroangular setae closed to midlaterals. Epimeral sutures incomplete; praepectal plates absent. Foretarsi each without tooth. Forewings not strongly constricted medially and with duplicated cilia. Meso and metathoracic sternopleural sutures reduced or absent; metathoracic anapleural sutures reduced.

Posterior pairs of wing retaining setae on each of abdominal tergites II and III hook-shaped; tergite VIII with a pair of short, simply curved wing retaining setae at middle. Sternites II- VIII each with transverse rows of fine accessory setae. Tube normal, shorter than head.

Adults are medium-sized thrips related to *Apelaunothrips* Karny (Okajima, 1984). They differ from those of the latter by their long, thin antennae, slender maxillary stylets, and by having wing retaining setae on tergite VIII. There are two species known in this genus, one from Malaysia (Okajima and Reyes, in press), the other from the Philippines.

Lizalothrips luzonensis **Okajima**
Lizalothrips luzonensis Okajima, 1984: 729-730.
Holotype female, Philippines: Luzon: Bicol National Park (**Okajima**) [not examined]

Diagnosis. Body bicolored and weak with red hypodermal pigment. Head brown; pronotum brownish yellow with brown lateral margins; abdominal tergites yellow, slightly shaded with pale brown laterally; tube yellow. Body setae yellowish. Eyes prolonged ventrally. Postocular setae shorter than dorsal length of eyes, with expanded apices. Antennae very slender; segments III to V greyish, with pale bases and apices. Pronotal major setae well developed, with expanded apices. Forewings greyish brown, with duplicated cilia. Pelta weakly developed. Tube shorter than head. This species is known only in the Philippines.

Female macroptera. Head brown and a little longer than wide, constricted basally; sculptured with wrinkle-like striae or reticules. Eyes about 0.50 times as long as head; prolonged ventrally. Postocular setae shorter than dorsal length of eyes, with expanded apices. Cheeks incut behind eyes. Antennal segments very slender; segments I and II brown; III to V greyish, pale in bases and in extreme apices; VI to VIII grey to dark grey; VII and VIII obliquely fused; segments III and IV with 2 and 3 sense cones respectively. Mouthcone rounded.

Pronotum brownish yellow with brown lateral margins; slightly sculptured; major setae developed, expanded apically. Legs slender. Forewings greyish brown, with 4 or 5 duplicated cilia; subbasal wing setae developed, expanded apically.

Pelta weakly developed, hat-shaped; slightly reticulate; campaniform sensilla absent. Abdominal tergites yellow, slightly shaded with pale brown laterally. B1 setae of tergite IX shorter than tube. Tube yellow, about 0.50 times as long as head. Anal setae much shorter than tube.

Male: Unknown.

Material examined. **Paratype** female, PHILIPPINES: Luzon: Bicol National Park, on dead leaves, 12-VIII-1979, S. Okajima (**TMNH**).

Distribution (Fig. 98). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Luzon. Philippines: Luzon: Bicol National Park.

Host. dead leaves.

Genus *Macrophthalmothrips* Karny

Macrophthalmothrips Karny, 1922b: 34. Replacement name for *Ophthalmothrips* Karny,
1920, nec *Ophthalmothrips* Hood, 1919
Type species: *Ophthalmothrips argus* Karny, by monotypy.

Diagnosis. Head longer than wide, usually without cheek setae; eyes large, holoptic, surrounding ocellar triangle. Antennae inserted ventrally; postocular setae slightly developed, closed together. Antennae 8-segmented, with suture between segments VII and VIII, incomplete in few taxa; segment III with 2 sense cones, IV with 3 or 4 sense cones. Maxillary stylets retracted into head to level of eyes. Mouthcone long, reaching mesosternum.

Pronotum with stout, median transverse apodeme, with transversely striate sculpture, and with 5 pairs of major setae, with expanded apices; epimeral sutures incomplete; praepectal plates absent; mesopraesternum broadly boat-shaped. Forefemora sometimes each with stout tubercle in males; foretibiae rarely each with tubercle on inner margin in major males; foretarsus sometimes with stout tooth in males. Meso and metanota sculptured; without major setae. Usually macropterous, with forewings expanded basally, parallel-sided towards apex and with duplicated cilia.

Pelta rather small, triangular. Abdominal tergites II-VII each with 2 pairs of sigmoid, wing-retaining setae; lateral sculpture of anterior tergites with rows of tuberculate microtrichia; tergite IX with B1 setae expanded at apex , shorter than tube; B2 setae acute, about as long as tube in both sexes. Males without sternal, glandular area.

Adults of *Macrophthalmothrips* are small to medium-sized fungus feeding phlaeothripine with holoptic eyes and a very long mouthcone, and are usually brown with white markings and red hypodermal pigment. Members of this genus resemble each other in many details of their structure. Most of the obvious differences are perhaps due to intraspecific variation associated with body size (Mound, 1972b). About 13 species are included in this genus (Mound and Houston, 1987). *M. quadricolor* is known from the Philippines.

Macrophthalmothrips quadricolor Karny
Macrophthalmothrips quadricolor Karny, 1923: 278-283.
Lectotype male, Indonesia: Celebes [Sulawesi], Boeton (SMFG) [examined].

Diagnosis. Body brown with red, white and yellow markings. Head longer than wide, widest behind eyes. Eyes holoptic. Postocular setae reduced. Antennal segments III to VII elongate and slender; segment III much longer than IV. Pronotal major setae developed, with expanded apices. Legs bicolored. Forefemora enlarged, each with pointed, subapical tooth, variable in size, co-occurringwith bowed foretibiae and tarsi to form as claw-like structures in one male specimen. Forewings yellow, base and margins darker, with duplicated cilia. Pelta broad, with posterior border close to anterior margin of abdominal tergite II. This is the first record of *M. quadricolor* in the Philippines.

Male macroptera. Head longer than wide, widest behind eyes ; gradually narrowed towards base; transversely striate; setae short. Ocellar hump prominent. Eyes holoptic, more than 0.35 times as long as head. Postocular setae reduced. Cheek setae fine. Antennal segment IV with 3 sense cones. Mouthcone long, pointed, reaching posterior margin of mesosternum.

Pronotum transversely striate; discal setae minute; major setae developed, expanded apically; epimeral setae longer than posteroangulars. Forefemora yellowish brown, enlarged, subapical tooth variable in size; foretibiae and foretarsi both strongly bowed in one specimen from the Philippines, which together with enlarged forefemoral tooth in each leg forms into claw-like structure. Mid and hindlegs bicolored yellow and brown. Forewings shaded with yellow, margins darker, each with a dark, median, longitudinal stripe; duplicated cilia present; subbasal wing setae developed, with expanded apices; S1 setae longer than S3. Metascutal median sculpture made up of longitudinal, anastomosed striae; median setae minute.

Pelta broad, posterior border close to anterior margin of tergite II; reticulate, reticules with internal markings. Abdominal tergites with strong reticulation medially.

Tergites II to VII brown medially, yellow on anterior and posterior third; wing retaining setae 2 pairs; B1 setae pale, expanded at apices. Tergites VIII to IX uniformly brown. B1 setae of tergite IX shorter than tube, blunt apically. Tube brown with light brown apex. Anal setae developed.

Female macroptera. Similar to male in color. Antennal segment IV with 4 sense cones. Forefemora without a tooth.

Material examined. 4 females, 2 males, Sagpangan, Palawan, on surface of bark, 24-V-1987, V. Fernando; 1 female, Aborlan, Palawan, on flower of unknown plant, 25-V-1987, C. P. Reyes; 1 female, Mt. Pangasugan, Baybay, Leyte, in Malaise trap, 18-VII-1983, A. Almeroda (**CPRC**).

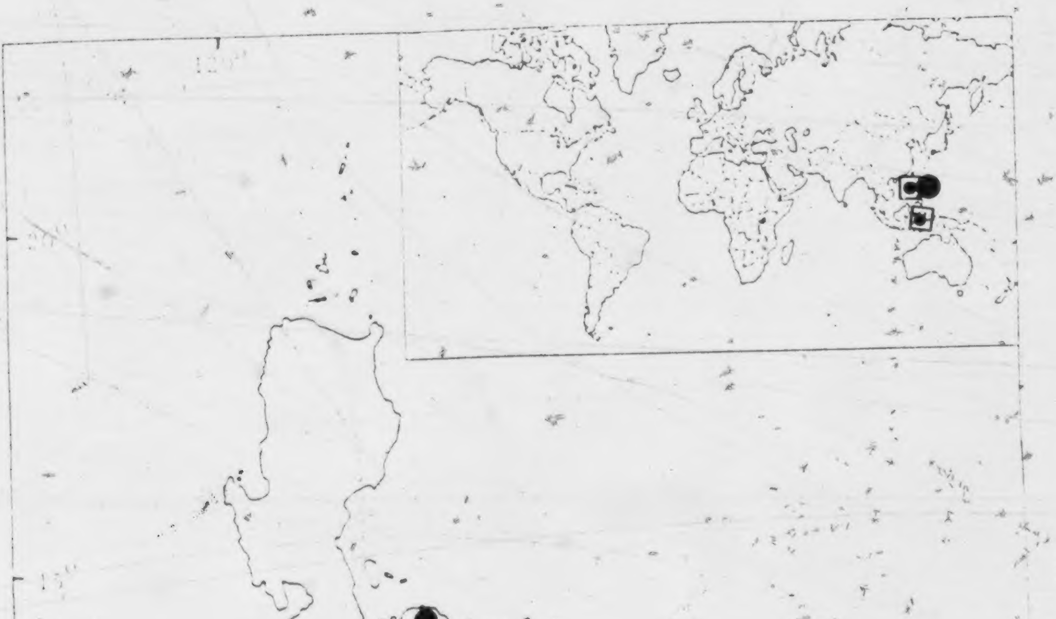
Distribution (Fig. 98). The known range of this species extends from the Philippines to the Indonesian Archipelago. In the Philippine Archipelago, this species is known from the islands of Visayas and Palawan. PHILIPPINES: Visayas: Mt. Pangasugan, Baybay, Leyte; Palawan: Sagpangan; Aborlan. INDONESIA: Celebes [Sulawesi].

Hosts. on surface of bark, flower of unknown plant, in Malaise trap, bark of *Ficus* sp.

Fig. 98. Distribution of *Lizalothrips philippinensis* Okajima and *Macrophthalmothrips quadricolor* Karny in the Philippines, and world.

● *Lizalothrips philippinensis* Okajima

▣ *Macrophthalmothrips quadricolor* Karny


120°
20°
15°
10°
125°

Genus *Mesothrips* Zimmermann

Mesothrips Zimmermann 1900: 12
Type species: *Mesothrips jordani* Zimmermann, by subsequent designation of
Priesner, 1929a.

Diagnosis. Head longer than wide, reticulate, strongly constricted and neck-like at base. Ocellar setae minute. Eyes medium sized; equally developed dorsally and ventrally or prolonged ventrally. Postocular setae developed, 1 pair. Cheeks usually with spine-like setae. Antennae 8-segmented; segment III usually with 2 or 3 sense cones. Maxillary stylets retracted into head about one third of head length. Maxillary bridge present. Mouthcone rounded.

Pronotum with faint transverse striae, with major setae developed; epimeral sutures complete. Praepectal plates present; probasisternum and mesopraesternum divided. Forefemora greatly enlarged in both sexes; foretibiae bowed; foretarsi each with stout triangular tooth. Forewings constricted medially and with duplicated cilia.

Pelta triangular. Abdominal tergites II-VII each with 2 pairs of wing retaining setae. Lateral side of tergites usually with numerous accessory setae. Tube conical.

About 27 species are presently included in *Mesothrips* that are mainly Oriental and Australian in distribution (Mound and Houston, 1987). Many of the species known are gall formers. Five species are known from the Philippines.

Key to Philippine species of *Mesothrips* Zimmermann

1 Postocular setae 2 pairs (Fig. 99a); foretarsal tooth absent ... *M. ignotus*, n. sp.

1' Postocular setae 1 pair; foretarsal tooth present 2

2(1') Forewings shaded with brown in apical half, pale in basal half; head about 2 times as long as wide .... *M. jordani* Zimmermann

2' Forewings pale or at most extreme base brown; head usually about 1.5 times as long as wide 3

3(2') Eyes prolonged ventrally; mid and hind tarsi light brown ... *M. leeuweni* Karny

3' Eyes equally developed dorsally and ventrally; mid and hind tarsi yellow 4

4 Foretibiae yellowish; spines toward base of head moderately developed .... *M. mendax* Karny

4(3') Foretibiae brown laterally; spines toward base of head developed .... *M. pyctes* Karny

Mesothrips ignotus n.sp.
Holotype male, Philippines: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro (UPLB)
Figure 99a, b, c, d

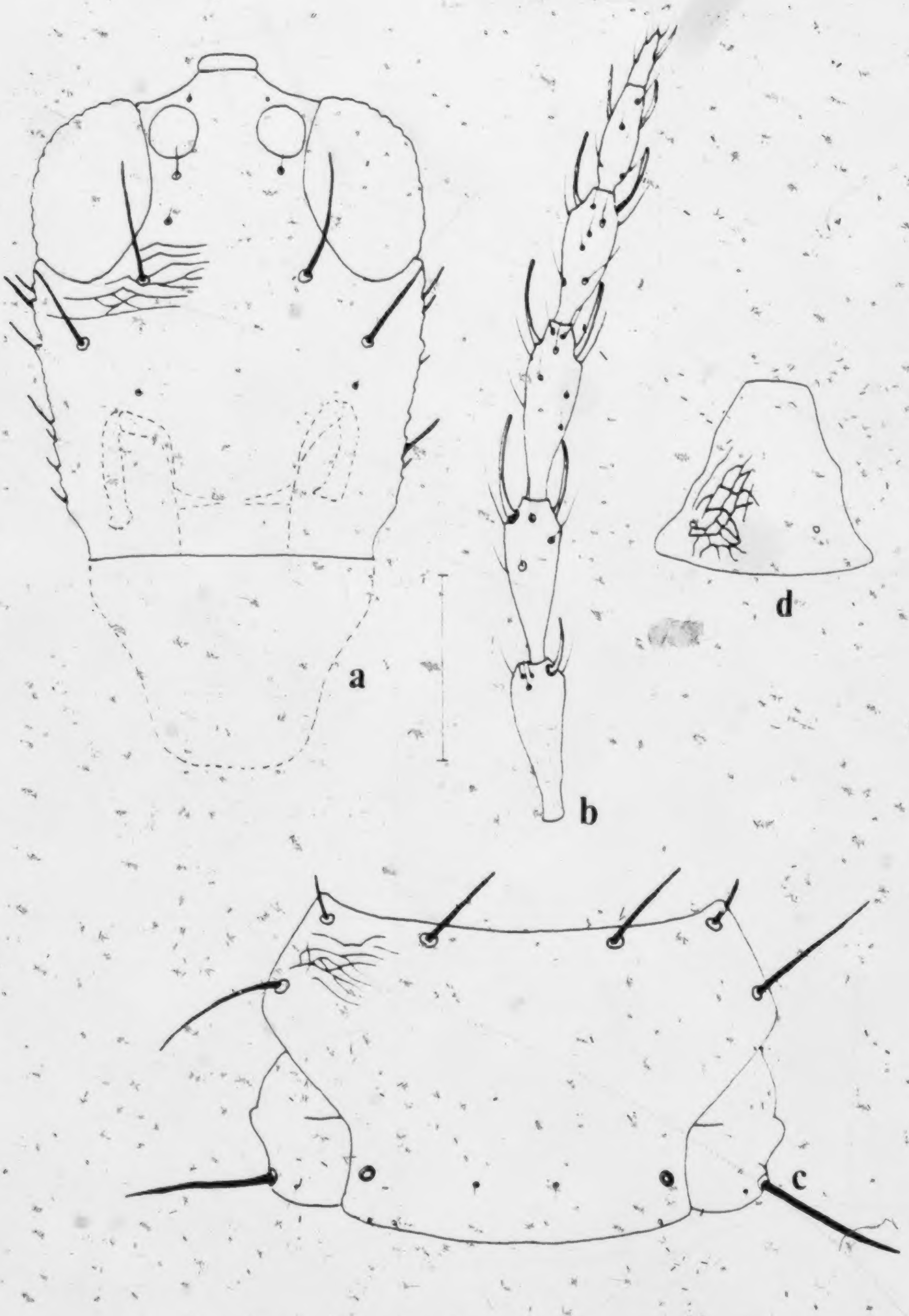
Diagnosis. Body dark brown. Body setae brownish. Head constricted at base. Postocular setae 2 pairs. Cheeks with spines. Antennal segments III and IV with 1 and 2 sense cones respectively. Pronotal major setae developed, with blunt apices. Legs bicolored; forefemora greatly enlarged; foretarsi without tooth. Forewings brown medially in apical half, with duplicated cilia. Pelta triangular. Abdominal tergites with few accessory setae. Tube shorter than head.

I have reservations in placing this species under *Mesothrips* for it has unconstricted rather than constricted forewings, 2 rather than 1 pairs of postocular setae, 1 sense cone on antennal segments III, few accessory setae on tergites, and lacks a foretarsal tooth as do adults of *Adelphothrips*. It is similar to *Mesothrips* adults in having praepectal plates, though weak in this species, a boat-shaped mesopraesternum, a constricted base of head, and well developed cheek spines. This species is known only from the type material.

Male macroptera. Head longer than wide, constricted at base; transversely reticulate (Fig. 99a). Ocellar hump prominent. Ocelli large. Eyes about one-third of head length. Postocular setae 2 pairs, with pointed apices; anterior pair longer than posterior pair. Cheeks setae spine-like. Antennal segments I and II brown, II pale on apical half; III to VIII yellow; III and IV with 1 and 2 sense cones respectively (Fig. 99b). Mouthcone rounded (Fig. 99a).

Pronotum reticulate; major setae well developed, with blunt apices; anteromarginal setae longer than anteroangulars; midlateral setae slightly longer than epimerals (Fig. 99c). Praepectal plates weak. Forefemora greatly enlarged, brown, with pale apices; all femora with numerous short, spine-like setae; mid and hindfemora brown; tibiae and tarsi yellow; foretarsi without tooth. Forewings brown medially in apical half; 6 duplicated cilia;

Fig. 99. *Mesothrips ignotus*, n. sp., male holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta


a
b
c
d

subbasal wing setae developed, dark, with blunt apices. Metascutum longitudinally reticulate.

Pelta triangular; reticulate, pair of campaniform sensilla present (Fig. 99d). Abdominal tergites reticulate laterally; accessory setae few. Tergites II to VII each with 2 pairs of wing retaining setae. B1 setae on tergite IX slightly shorter than tube, with pointed apices. Tube conical, shorter than head, pale at apex. Anal setae well developed.

Dimensions (holotype male; um). Body length (extended) 2,114.8. Head length 270.6, median width 190.4; dorsal eye length 96.9; postocular setae length: pair I 64.6; pair II 54.4; antennal segments length: I 49.3; II 52.7; III 83.3; IV 86.7; V 83.3; VI 76.5; VII 59.5; VIII 35.7. Pronotum length 158.1, median width 268.6, major setae length: aa 32.3, am 52.7, ml 103.7, ep 10[illegible] Tergite IX B setae length: B1 173.4, B2 64.6, B3 241.4. Tube length: 183.6.

Type data. **Holotype** male, PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro, on leaf of unknown vine, 20-VI-1987, C. P. Reyes (**UPLB**).

Female. Unknown.

Material examined. **Holotype** only (**UPLB**).

Etymology. Ignotus is a Latin word meaning "unknown" or "strange".

Distribution (Fig. 100). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro.

Host. leaf of unknown vine.

Mesothrips jordani Zimmermann

Mesothrips jordani Zimmermann, 1900: 12.
Syntype female, Indonesia: Java (**SMFG**)[examined]

Diagnosis. Brown species. Body setae pale. Head more than 2.0 times as long as wide. Eyes slightly prolonged ventrally. Postocular setae shorter than or subequal to dorsal length of eyes, with blunt apices. Cheek setae spine-like. Antennae bicolored. Pronotal major setae well developed, with blunt apices. Legs bicolored. Forewings shaded with brown on apical half, with duplicated cilia. Pelta bell-shaped. Tube brown, with pale apex, shorter than head.

This is the first record of *M. jordani* in the Philippines. Members of this species are near to those of *M. constrictus* (Karny) which are also known in Indonesia and associated with *Ficus retusa* and *Ficus benjamina*.

Female macroptera. Head more than 2.0 times as long as wide; reticulate; constricted at base. Ocellar hump small; ocelli large. Eyes about 0.35 times as long as head, slightly prolonged ventrally. Postocular setae shorter than dorsal length of eyes, with blunt apices. Cheeks with spine-like setae. Antennal segments I and II brown, II pale apically; III to VI yellowish; VII to VIII brown, VII pale on basal half. Mouthcone rounded.

Pronotum faintly reticulate; major setae developed, with blunt apices; anteroangular setae longer than anteroangulars; posteroangular and epimeral setae long, subequal. Femora brown; forefemora enlarged; mid and hindfemora each with numerous small, spine-like setae on outer margin; foretibiae yellowish brown; mid and hindtibiae brown; tarsi yellow; foretarsi each with stout tooth. Forewings shaded with brown in apical half; 15 duplicated cilia; subbasal wing setae developed, brownish; setae S2 and S3 longer than S1. Metascutum with longitudinal reticulation.

Pelta bell-shaped; reticulate; pair of campaniform sensilla present. Abdominal tergites reticulate, with numerous accessory setae. Tergites II to VII each with 2 pairs of wing retaining setae. B1 setae of tergite IX shorter than tube, with pointed apices. Tube conical; brown with pale apex, shorter than head. Anal setae well developed.

Male macroptera. Similar to female in structure but body smaller. Antennal segments III to VI yellowish with brown apices; apices gradually darkened towards posterior segments. Foretibiae brown.

Material examined. 4 females, 2 males, Manila, on *Ficus* sp., 15-V-1964, N. Krauss (**BPBM**); 3 females, 2 males, Sipit Saburan, Puerto Gallera, Oriental Mindoro, on *Ficus benjamina*, 11-VII-1987, C. P. Reyes; 1 male, UPLB, Los Banos, Laguna, on leaves of *Ficus* sp., 25-XI-1982, C. P. Reyes. **SMFG**: 2 females, 1 male, Los Banos, [Laguna], on *Ficus* sp., C. Baker (**CPRC**).

Distribution (Fig. 100). The known range of this species extends from Thailand eastward in the Philippines to Indonesia Archipelago. In the Philippine Archipelago, this species is known from the islands of Luzon and Visayas. PHILIPPINES: Luzon: Manila; Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro. INDONESIA: Java. CAMBODIA. THAILAND. SINGAPORE. HONGKONG.

Hosts. leaves of *Ficus* sp., *Ficus benjamina*, leaves of *Ficus balete*, *Ficus retusa*, *Ficus benjamina*, *Melastoma malabathricum*

Mesothrips leeuweni **Karny**
Mesothrips leeuweni Karny, 1913b: 71-73.
Syntypes male, female, Indonesia (**SMFG**) [examined].

Diagnosis. Body brown. Body setae brownish. Head longer than wide, strongly constricted at base. Eyes prolonged ventrally. Postocular setae shorter than dorsal length of eyes. Cheek setae spine-like, clustered towards base. Antennae bicolored. Pronotal major setae well developed, with blunt apices. Legs bicolored. Forewings pale, each with a dark, median longitudinal stripe in basal half and with duplicated cilia. Pelta widely bell shaped. Tube brown, with pale apex, about as long as head.

This is the first record of *M. leeuweni* in the Philippines. Adults of this species are similar to *M. mendax* and *M. pyctes* in having pale forewings but differ from those of the latter by having ventrally prolonged eyes and larger body.

Female macroptera. Head more than 1.5 times as long as head; reticulate; strongly constricted at base. Ocelli large. Eyes about 0.35 times as long as head, prolonged ventrally. Postocular setae shorter than dorsal length of eyes, with blunt apices. Cheek setae spine-like, clustered towards base. Antennal segments I and II brown, II pale at apex; segment III to VI yellowish ; VII and VIII yellowish brown. Mouthcone rounded.

Pronotal major setae developed, with blunt apices; anteroangular setae longer and stouter than anteromarginals; epimeral setae about as long as posteroangulars. Femora brown; mid and hindfemora each with numerous spine-like setae; foretibiae yellowish brown; mid and hindtibiae brown with pale apices; foretarsi yellow, each with tooth; mid- and hindtarsi light brown. Forewings each with dark, median, longitudinal stripe in basal half; 19 to 20 duplicated cilia; subbasal wing setae developed, dark, with blunt apices. Metanotum longitudinally reticulate.

Pelta widely bell-shaped; reticulate; campaniform sensilla present. Abdominal tergites reticulate; accessory setae numerous. Tergites II to VII each with 2 pairs of wing retaining setae. B1 setae of tergite IX slightly longer than tube, with pointed apices. Tube about as long as head; apex pale. Anal setae short.

Male macroptera. Similar to female in general color and structure but smaller. Not yet known in the Philippines.

Material examined. 1 female, Anuling, Pamocotan, Zamboanga, on leaf of unknown plant, 11-VII-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 100). The known range of this species extends from the Philippines to the Indonesian Archipelago. In the Philippines, this species is known from the island of Mindanao. PHILIPPINES: Mindanao: Anuling, Pamocotan, Zamboanga. INDONESIA: Java.

Hosts. leaf of unknown plant, galls of *Conocephalus naucleiflorus*

Mesothrips mendax **Karny**
Neoheegeria mendax Karny, 1912c: 122-124.
Syntypes male, female, Indonesia: Java (**SMFG**)[examined]
Neoheegeria mendax Karny; Uichanco, 1919: 548.

Diagnosis. Body brown. Body setae yellowish brown. Head longer than wide, constricted at base. Postocular setae about as long as eyes, with nearly pointed apices. Cheek setae spine-like. Antennae bicolored. Pronotal major setae developed, with blunt apices. Legs bicolored. Forewings pale, with duplicated cilia. Pelta bell-shaped. Tube dark brown on basal half, slightly longer than head.

Female macroptera. Head less than 1.5 times as long as wide; constricted at base, faintly reticulate. Ocelli large. Eyes about 0.35 as long as head. Postocular setae developed, about as long or slightly longer than eyes, with knobbed apices. Cheeks setae spine-like. Antennal segments I and II brown, II pale at apex; segments III to VI yellowish, VI and VIII greyish, VIII constricted basally. Mouthcone rounded.

Pronotal major setae developed, with blunt apices; anteromarginal setae slightly longer than anteroangulars; posteroangular setae longer than epimerals. Femora brown; mid and hind femora with slender setae; foretibiae yellowish; mid and hindtibiae brown with pale apices; tarsi yellowish; foretarsi each with tooth. Forewings pale, each with 15 to 16 duplicated cilia; subbasal wing setae yellowish brown, developed, S3 longest, with nearly pointed apices. Metanotum longitudinally reticulate.

Pelta bell-shaped, reticulate; campaniform sensilla present. Abdominal tergites with numerous accessory setae. Tergites II to VII each with 2 pairs of wing retaining setae. Tube dark brown on basal half, pale in apical half, slightly longer than head. Anal setae well developed.

Male macroptera. Similar to female in general color and structure but smaller.

Material examined. 1 female, Gaggabutan Forest, Rizal, on rolled leaves of Curran's Lipote, 29-III-1977, L. C. Raros (**CPRC**).

Distribution (Fig. 100). The known range of this species extends from the Philippines to the Indonesia Archipelago. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: Los Banos, Laguna. INDONESIA: Java.

Hosts. This species produce galls on leaves of *Mallotus philippinensis* in Los Banos (Uichanco, 1919). Many of these thrips were taken from rolled leaves of Currans's Lipote but several specimens were damaged when they were mounted on slides (they were so brittle because of having been preserved for a long time in 70% alcohol solution).

***Mesothrips pyctes* Karny**
Mesothrips pyctes Karny, 1916: 131; 191-193.
Syntype female, Indonesia: Tempoeran, Java (SMFG)[examined]

Diagnosis. Body brown. Body setae yellowish brown. Head longer than wide. Postocular setae shorter than dorsal length of eyes, nearly pointed at apices. Cheek setae spine-like, setae near base most developed. Antennae bicolored. Pronotal major setae developed, with blunt apices. Legs bicolored. Forewings pale, brown basally, with duplicated cilia. Pelta bell-shaped. Tube dark brown in basal three quarters, pale on apical quarter. This is the first record of *M. pyctes* in the Philippines.

This species differ from *M. mendax* in having stronger spine-like setae near base of head, larger body and shorter postocular setae.

Female macroptera. Head more than 1.5 times as long as wide; constricted at base, reticulate. Ocelli large. Eyes more than 0.35 times as long as head. Postocular setae shorter than eyes, with slightly pointed apices. Cheeks setae spine-like, those near base most developed. Antennal segments I and II brown, II pale apically; segments III yellow; segments IV to VI yellowish basally, yellowish brown on apical half; segments VII to VIII brown. Mouthcone rounded.

Pronotal major setae developed, blunt apically; anteroangular and anteromarginals subequal; epimeral and posteroangular setae subequal. Femora brown; foretibiae yellow medially, brown laterally; mid and hindtibiae brown, with pale apices; tarsi yellow; foretarsi each with tooth. Forewings pale, each with about 16 duplicated cilia; subbasal wing setae dark, well developed, blunt apically. Metanotum longitudinally reticulate.

Pelta bell-shaped; reticulate; pair of campaniform sensilla present. Abdominal tergites reticulate, with numerous accessory setae. Tergites II to VII each with 2 pairs of wing retaining setae. Tube dark brown in basal three quarters, pale in apical quarter, about as long as head. Anal setae developed.

Male. ?Unknown

Material examined. 1 female, Sipit Saburan, Puerto Gallera, Oriental Mindoro, on *Piper betle*, 20-VI-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 100). The known range of this species extends from the Philippines to the Indonesian Archipealgo. In the Philippine Archipelago, this species is known from the island of Visayas. PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro. INDONESIA: Java.

Hosts. *Piper betle*, *Eugenia* sp.

Fig. 100. Distribution of *Mesothrips* species in the Philippines, and world.

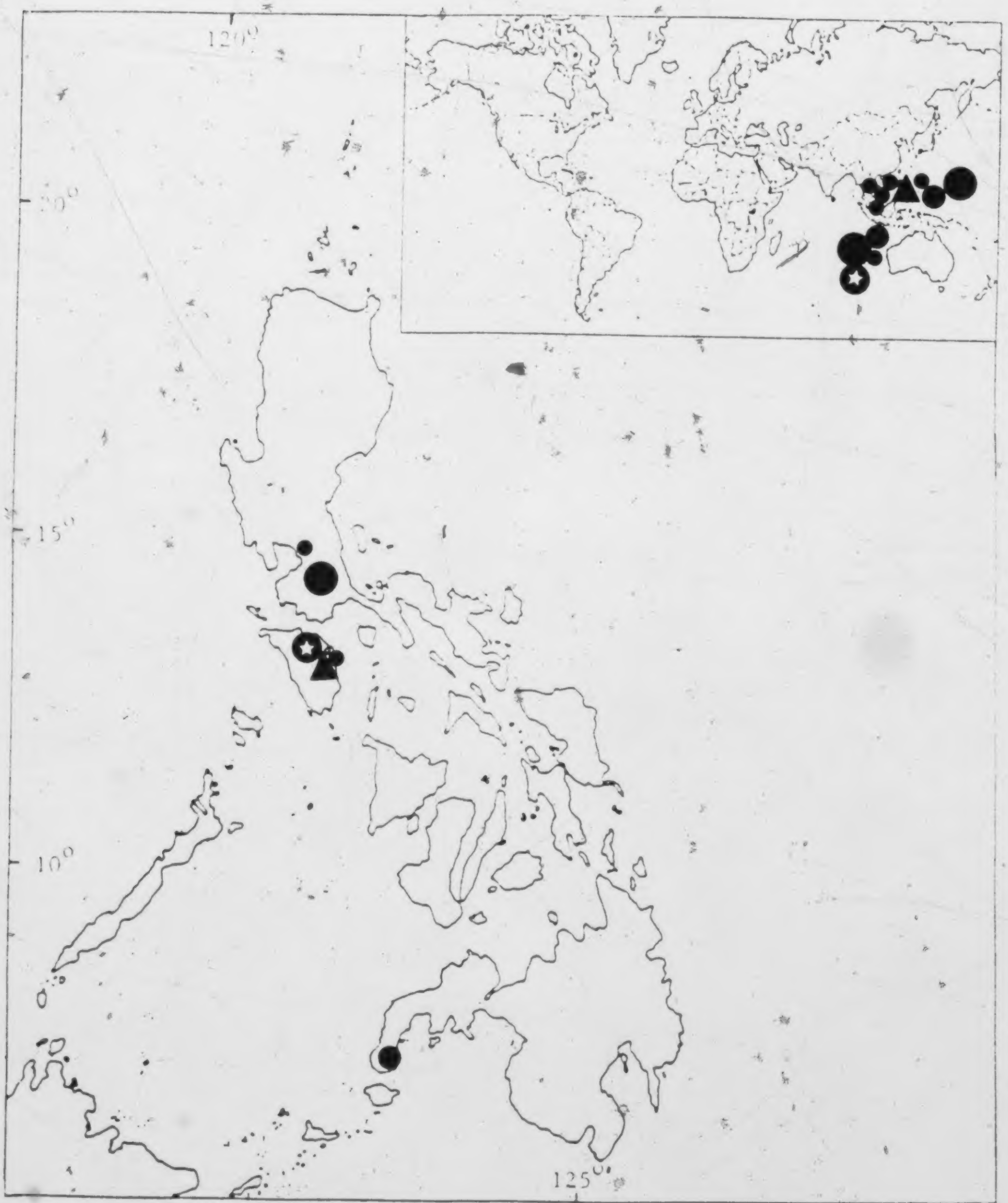
▲ *M. ignotus*, n. sp.

• *M. jordani* Zimmermann

● *M. leeuweni* Karny

⬤ *M. mendax* Karny

✪ *M. pyctes* Karny


120°
20°
15°
10°
125°

Genus *Mystrothrips* Priesner

Mystrothrips Priesner, 1949: 117
Type species: *Sagenothrips dammermanni* Priesner, by monotypy.

Diagnosis. Head longer than broad, concave on posterior dorsal margin, deeply incut behind eyes; postocular setae short and expanded; one pair of postocellar and middorsal setae present; cheeks tapered slightly to base of head, with about 5 fine, recurved setae; maxillary stylets wide apart, retracted about halfway into head capsule; antennae 8-segmented, with sculpture; segment III and IV each with 3 sense cones, terminal setae longer than segment VIII.

Pronotum reticulate; epimeral sutures complete; anteroangular setae not close to midlateral setae ; praepectal plates not developed; mesopraesternum slightly sculptured, broadly boat-shaped; foretarsal claw slender, slightly curved. Mesonotum with lateral setae developed, broadly expanded. Median setae on metanotum slender. Basal wing setae 3 pairs, with expanded apices.

Pelta broad, reticulate, withdrawn into concave anterior margin of tergite II. Tergites II-VII each with 2 pairs of sigmoid wing retaining setae. Sternites each with row of about 12 accessory setae. B1 and B2 setae on tergite IX long, with round apices; B3 setae acute. Tube faintly sculptured with overlapping scales. Anal setae shorter than tube.

Adults of *Mystrothrips* species are distinguished by their strongly reticulate body, sculptured antennal segments and broadly expanded major body setae. Three species are included in this genus and are usually found in leaf litter (Mound, 1970). *M. dammermanni* (Priesner) is known from the Philippines.

***Mystrothrips dammermanni* (Priesner)**
Sagenothrips dammermanni Priesner, 1933b: 75.
Syntype female, Indonesia: Java (**SMFG**)[examined]

Diagnosis. Body bicolored. Body yellow except abdominal tergite II and sides of head shaded with brown. Body setae fan-shaped. Head longer than wide, strongly reticulate. Postocular setae shorter than dorsal length of eyes, fan-shaped. Cheeks strongly incut behind eyes. Antennal segments III to V pale in basal quarter, brown in apical three-quarters. Pronotal major setae well developed, fan-shaped. Legs yellow. Forewing brownish, pale medially, without duplicated cilia. Pelta broad. Tube shorter than head.

This is the first record of *M. dammermanni* in the Philippines. Members of this species resemble *M. dilatus* Mound known from Solomon Islands but *M. dammermanni* have shorter and more broadly expanded, fan-shaped setae on the head and pronotum (Mound, 1970).

Female macroptera. Head longer than wide, strongly reticulate. Ocellar hump small. Eyes about 0.35 times as long as head. Postocular setae shorter than length of eyes, fan-shaped. Cheeks strongly incut behind eyes. Antennae brownish, about 2.2 times as long as head; campaniform sensillum on segment II positioned near apex; III to V pale in basal quarter, brown in apical three-quarters; VII to VIII brown; VIII constricted basally. Mouthcone rounded.

Pronotum reticulate; major setae fan-shaped; anteroangular setae longer than midlaterals; posteroangular setae longer than epimerals. Legs yellow; forefemora slender; foretarsi each with short tooth. Forewings slender; brownish, pale medially; duplicated cilia absent; subbasal wing setae developed, fan-shaped; setae S3 longest, about 1.8 times as long as S1. Metanotum reticulate.

Pelta broad, reticulate. Abdominal tergites and sternites reticulate. Tergites II to VII each with 2 pairs of wing retaining setae; anterior pair simple; posterior pair stout, curved. B1 setae of tergite IX shorter than tube, with rounded apices. Tube yellowish, nearly parallel-sided, shorter than head. Anal setae shorter than tube.

Male macroptera. Similar to female in general color and structure but smaller.

Material examined. 1 female, 1 male, Makiling Rainforest, Mt. Makiling, in litter, 27-VI-1983, C. P. Reyes (**CPRC**).

Distribution (Fig. 101). The known range of this species extends from the Philippines to the Indonesian Archipelago. In the Philippines, this species is known from Luzon. PHILIPPINES: Luzon: Makiling Rainforest, Mt. Makiling, Laguna. INDONESIA: Java.

Host. in litter.

Genus *Phylladothrips* Priesner

Phylladothrips Priesner, 1933b: 79-80.
Type species: *Phylladothrips karnyi* Priesner, by monotypy.
Paradexiothrips Okajima, 1984: 730.

Diagnosis. Head about as long as wide or wider; postocellar setae developed; antennae 8-segmented; segment III with 3 sense cones; segment IV with 4 sense cones. Maxillary stylets retracted far into head capsule, maxillary bridge present or absent. Mouthcone short and rounded.

Pronotal anteroangular setae not developed and not close to midlateral setae; epimeral sutures incomplete; praepectal plates reduced or absent; prospinasternum reduced; metathoracic sternopleural sutures absent; foretarsi without tooth. Forewings weakly constricted medially, without duplicated cilia.

Pelta weak or well defined with lateral lobes. Abdominal tergites II-VII each with 2 pairs of short, slightly curved, wing retaining setae; tergite VIII with 1 or 2 pairs of wing retaining setae near posterior margin; tube shorter than head.

Most known species of *Phylladothrips* are from East Asia and are primarily fungal feeders (Okajima, 1988). Originally, this genus was placed by Priesner (1933b) under Haplothripini. In his work on *Phylladothrips* from East Asia, Okajima (1988) transferred this genus to Phlaeothripini and treated *Paradexiothrips* Okajima (a genus he erected for *P. bispinosus* from the Philippines and placed under Apelaunothripini due to the diameter of the maxillary stylets of these thrips (Okajima, 1984)) a junior synonym of *Phylladothrips*. Okajima (1988) noted that the diameter of the maxillary stylets of this group is variable. Nine species are included under this genus of which 4 are known from the Philippines.

Key to Philippine species of *Phylladothrips* Priesner

1 Abdominal tergite VIII with 1 pair of wing retaining setae; postocellar setae with expanded apices .... *P. bispinosus* Okajima

1' Abdominal tergite VIII with 2 pairs of wing retaining setae; postocellar setae pointed 2

2(1') Head much wider than long; abdominal tergites uniformly dark brown .... *P. niger* Okajima

2' Head about as long as wide or slightly wider; abdominal tergites bicolored 3

3(2') Abdominal tergite II clear yellow, anterior margin shaded with brown; pronotum weakly sculptured posteriorly .... *P.fasciae* Okajima

3' Abdominal tergites II to III yellow; pronotum smooth .... *P.similis* Okajima

Phylladothrips bispinosus **(Okajima)**
Paradexiothrips bispinosus Okajima, 1984: 731.
Holotype female, Philippines: Mindanao: Agko, Mt. Apo (**Okajima**) [not examined].

Diagnosis. Body brownish yellow to brown. Head brownish yellow, with brown lateral margins; abdominal tergites VIII and IX and tube brown; meso and metanota and abdominal tergites II to VII yellowish brown. Body setae yellowish. Head about as long as wide. Postocellar setae developed, with expanded apices. Postocular setae shorter than dorsal length of eyes, with expanded apices. Antennae brown; segment III about as long as IV. Pronotal major setae developed, with expanded apices. Legs bicolored. Forewings light brown, without duplicated cilia. Pelta large, broad medially, reticulate. Tube shorter than head.

This species is known only from the type material. Unlike the 3 other species known from the Philippines, adults of *P. bispinosus* have 1 pair of wing retaining setae rather than 2 on abdominal tergite VIII, and their postocellar setae with expanded apices.

Female macroptera. Head brownish yellow, with brown lateral margins; 1.1 times as long as wide; with slight reticulation laterally and posteriorly. Eyes about 0.40 times as long as head. Postocellar setae developed, with expanded apices. Postocular setae much shorter than dorsal length of eyes, with expanded apices. Cheeks slightly incut behind eyes. Antennal segments brown; segment III with pale base; III about as long as IV; VII broad at base. Mouthcone rounded.

Pronotum brown; slightly reticulate posteriorly; major setae developed, expanded apically; anteromarginal setae slightly longer than anteroangulars; posteroangular and epimeral setae subequal. Femora brown; tibiae mostly yellow, shaded with brown basally; tarsi yellow. Forewings shaded with pale brown; duplicated cilia absent; fringe cilia widely spaced; subbasal wing setae developed, with expanded apices. Meso and metanota yellowish brown; lateral margins brown.

Pelta large, broad medially, reticulate; pair of campaniform sensilla absent. Abdominal tergites II to VII yellowish brown medially, brown laterally, each with 2 pairs of wing retaining setae. Tergites VIII and IX brown; VIII with 1 pair of simply curved wing retaining setae placed near posterior margin. B1 setae of tergite IX much shorter than tube, with expanded apices; B2 setae with pointed apices, longer than tube. Tube brown, parallel-sided, shorter than head. Anal setae a little shorter than tube.

Male macroptera. Similar to female in general structure and color. Body smaller; abdomen slender.

Material examined. I was not able to borrow Okajimas's specimens.

Distribution (Fig. 101). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo.

Host. dead fronds of Palmae

***Phylladothrips fasciae* Okajima**
Phylladothrips fasciae Okajima, 1988: 709-711.
Holotype female, Indonesia: Central Sulawesi (**Okajima**) [not examined]

Diagnosis. Body bicolored. Head, pronotum and abdomen except tergite II brown; tergite II yellow. Body setae yellowish. Head about as long as wide. Postocellar setae well developed, with pointed apices. Postocular setae shorter than length of eyes, with expanded apices. Antennal segment III yellowish, shaded with grey apically. Pronotal anteromarginal setae short, slender, with blunt to nearly pointed apices. Legs bicolored. Forewings greyish brown. Pelta large, broad, and with distinct reticulation medially. Pelta shorter than head.

The only female known from the Philippines differ from the type material from Indonesia in having longer postocular setae and darker antennal segments III to V (Okajima, 1988). Adults of *P. fasciae* are similar to those of *P. similis* in having yellow abdominal tergite II but differ from the latter in the shape of the head and pelta, and in having brown rather than yellow abdominal tergite III.

Female macroptera. Head dark brown, about as long as wide or slightly wider; transversely reticulate. Postocellar setae slightly longer than diameter of posterior ocelli, with pointed apices. Eyes about 0.40 times as long as head. Postocular setae shorter than dorsal length of eyes, with expanded apices. Antennae 2.3 to 2.4 times as long as head; segments I, II, and IV to VIII dark brown; IV and V with pale bases; III yellowish, shaded with grey apically. Mouthcone rounded.

Pronotum dark brown; slightly sculptured posteriorly; anteromarginal setae short, slender, blunt to nearly pointed apically; posteromarginal and epimeral setae with expanded apices. Femora brown; foretibiae tinged with brown; mid and hindtibiae yellow; tarsi yellow. Forewings greyish brown, extreme bases pale.

Pelta large, broad medially, with distinct median reticulation; pair of campaniform sensilla absent. Abdominal tergite II yellow, anterior margin shaded with brown. Tergites

III to IX and tube dark brown. Tergites II to VIII each with 2 pairs of wing retaining setae; posterior pair on tergite VIII slender. B1 setae on tergite IX a little shorter than tube, expanded apically; B2 seta slightly expanded apically, subequal to B1. Tube about 0.60 times as long as head; 1.6 to 1.7 times as long as basal width. Anal setae about as long as tube.

Male macroptera. Similar to female in color and general structure. Body smaller. B2 setae on tergite IX a little shorter than B1, blunt apically. Apex of aedeagus broad.

Material examined. I was not able to borrow Okajima's specimen.

Distribution (Fig. 101). The known range of this species extends from the Philippines to Indonesian Archipelago. In the Philippines, this species is known from the island of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo. INDONESIA: Central Sulawesi; Bali Is.

Hosts. dead fronds of Palmae, dead leaves, dead branches

Phylladothrips niger Okajima

Phylladothrips niger Okajima, 1988: 714-716.
Holotype female, Malaysia: West Malaysia: Cameron Highland, Tanah Rata (**Okajima**)[not examined]

Diagnosis. Body uniformly dark brown. Body setae yellowish. Head much wider than long. Postocellar setae developed, with pointed apices. Postocular setae shorter than dorsal length of eyes, with expanded apices. Antennal segments III to V dark brown, with basal quarter to third yellow. Pronotal anteromarginal setae short, slender, with blunt apices. Legs bicolored. Forewings brownish. Pelta large, finely reticulate. Tube shorter than head.

This species is known from a male in the Philippines which Okajima (1988) described as exceptionally small compared to other males in this species but with wider head and shorter antennal segment I[illegible] This species differ from *P. fasciae* and *P. similis* in having a uniformly dark brown body, and by the shape of the head and pelta.

Female macroptera. Head much wider than long, slightly reticulate on posterior half. Postocellar setae longer than diameter of posterior ocelli, with pointed apices. Eyes about 0.43 to 0.44 times as long as head. Postocular setae shorter than dorsal length of eyes, expanded apically. Antennae about 2.5 times as long as head; segments I, II, and VI to VIII dark brown; III to V dark brown, with basal quarter to third yellow; IV much longer than segment III. Mouthcone rounded.

Pronotum with reticulation posteriorly; major setae developed; anteromarginal setae short, slender, with blunt apices; posteromarginal and epimeral setae with expanded apices. Praepectal plates not developed. Femora and tibia brown, with extreme apices pale; tarsi yellowish. Forewings shaded with brown; subbasal wing setae well developed, with expanded apices.

Pelta large, finely reticulate; pair of campaniform sensilla absent. Abdominal tergites II to VIII each with 2 pairs of wing retaining setae; posterior pair on tergite VIII nearly as stout as anterior pair. B1 setae on tergite IX about as long as tube or shorter, with expanded apices; B1 and B2 setae subequal, slightly expanded apically. Tube about 0.60 times as long as head; about 1.5 times as long as basal width. Anal setae shorter than tube.

Male macroptera. Similar to female in color and general structure. Body smaller. B2 setae of abdominal tergite IX longer than B1.

Material examined. I was not able to borrow Okajima's specimen.

Distribution (Fig. 101). The known range of this species extends from the Philippines to Malaysia. In the Philippine Archipelago, this species is known from the island of Luzon. PHILIPPINES: Luzon: Bicol National Park. MALAYSIA: West Malaysia.

Host. dead leaves

Phylladothrips similis Okajima
Phylladothrips similis Okajima, 1988: 719-721.
Holotype female, Philippines: Mindanao: Agko, Mt. Apo (**Okajima**) [not examined]

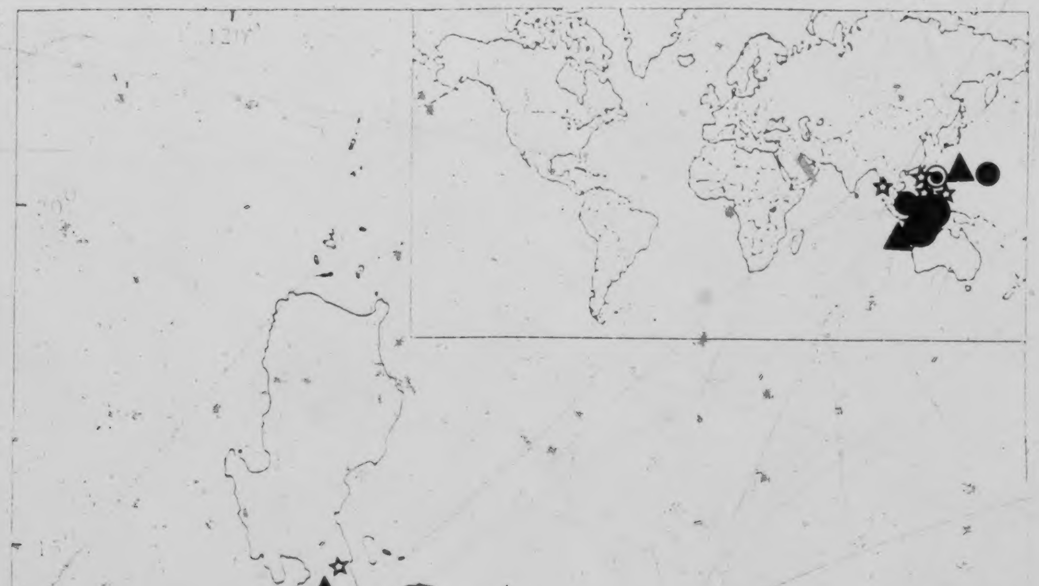
Diagnosis. Since I was not able to examine the type material of this species, Okajima's original brief description of this species is quoted below. "*P. similis* is very similar to *P. pictus* which is known from Japan and Taiwan. This species is mainly distinguished from the latter by the shape of male genitalia and body color. Midfemora brown, with pale apices. Abdominal tergites II and III yellow; tergites IV, V and IX brown; VI to VIII brown to brownish yellow, gradually paled posteriorly. Apex of male aedeagus slightly narrowed."

Distribution (Fig. 101). The known range of this species extends from Malaysia eastward in the Philippines to the Indonesia Archipelago. In the Philippine Archipelago, this species is known from the islands of Luzon and Mindanao. PHILIPPINES: Luzon: Quezon National Forest Park; Bicol National Park; Mindanao: Agko, Mt. Apo; Ilomavis, [Kidapawan], North Cotabato. INDONESIA: Central Sulawesi. THAILAND. MALAYSIA: West Malaysia.

Hosts. dead leaves, dead branches, dead fronds of Palmae, dead leaves and branches

Fig. 101. Distribution of *Mystrothrips dammermanni* Priesner and *Phylladothrips* species in the Philippines, and world.

- ▲ *Mystrothrips dammermanni* Priesner
- ◉ *Phylladothrips bispinosus* (Okajima)
- ● *Phylladothrips fasciae* Okajima
- ● *Phylladothrips niger* Okajima
- ☆ *Phylladothrips similis* Okajima


120°
20°
15°
10°
125°

Genus *Plectrothrips* Hood

Plectrothrips Hood, 1908: 370.
Type species: *Plectrothrips antennatus* Hood, by monotypy.

Diagnosis. Head variable in shape, as long as wide or shorter; postocular setae short, pointed apically. Posterior ocelli close to inner margins of compound eyes. Antennae 8-segmented; segment II with campaniform sensillum in basal half; VIII long and slender. Maxillary bridge usually present.

Pronotum reduced to median shield, without prominent setae; praepectal plates absent; forewings broad, parallel-sided, with duplicated cilia. Midtibiae each with 1 or 2 apical, spur-like setae.

Pelta broad, with slender lateral sclerites. Tergite II eroded laterally. Median sternites often with paired, scale-like, or worm-like glandular areas in both sexes. Tube variable in length. Anal setae short or long.

Plectrothrips includes 29 species known mainly from the tropics (Okajima, 1981). These small to medium-sized, yellowish brown, fungus feeders are usually found on dead branches and under the bark of trees. I was able to examine 3 unreported males in Okajima's collection belonging to this genus from Mindanao which he did not accord specific names. Since females of this group are very useful for specific determination, no attempt is presently made to place these male specimens in existing species. I thus temporarily designate them as sp. 1 and sp. 2 until more material is at hand.

Contrary to the report of Mound and Houston (1986) that "*P. orientalis* has since been collected from the Philippines by Dr. Okajima", I was able to confirm with Okajima that this species still remains unknown in the Philippines, however, I am positive that they are present in that part of the world.

Key to Philippine species of *Plectrothrips* Hood

1 Maxillary bridge narrow, not arched; maxillary stylets close together in middle of head; forefemora yellow in apical third .... *P*. sp. 1

1' Maxillary bridge arched; maxillary stylets forming V in head; forefemora brown but pale in apices .... *P*. sp. 2

Plectrothrips sp. 1
Males, Philippines: Mindanao: Agko, Mt. Apo (**Okajima**)

Diagnosis. Adult males of *Plectrothrips* sp. 1 are very near to those of *P. antennatus* Hood and *P. orientalis* Okajima in general structure including maxillary stylets close together in the middle of the head, and maxillary bridge narrow and not arched. They differ from both in having the head about 1.2 times as long as wide; femora yellow in apical third; tibiae and tarsi yellow. Adults males of *P. antennatus* have head slightly longer than wide; femora usually dark brown, sometimes yellow, and all tibiae yellowish brown while those of *P. orientalis* have head about 1.1 times as long as wide; foretibiae brownish yellow; femora, mid and hindtibiae dark brown.

In the absence of females, Okajima (pers. comm) hesitated to include these specimens from the Philippines in either *P. antennatus* or *P. orientalis*. Males belonging to related species are difficult to distinguish in this genus.

Material examined. 2 males, PHILIPPINES: Mindanao: Agko, Mt. Apo, on dead leaves, 3-VIII-1979, S. Okajima (**Okajima**).

Distribution (Fig. 103). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Mindanao. Philippines: Mindanao: Agko, Mt. Apo.

Host. dead leaves.

5

Plectrothrips sp. 2

Male, Philippines: Mindanao: Agko, Mt. Apo (**Okajima**)

Diagnosis. The single adult male of *Plectrothips* sp. 2 is very near to *P. indicus* Okajima in general structure including maxillary stylets forming a V in the head and maxillary bridge arched. *Plectrothrips* sp. 2 differs from the latter in having eyes not more than 0.40 times as long as head, and femora brown, with pale apices. Adult males of *P. indicus* have eyes more than 0.40 times as long as head, and femora brown in basal half, yellow in apical half. As in *Plectrothrips* sp. 1, the female of *Plectrothrips* sp. 2 is not known.

Material examined. 1 male, PHILIPPINES: Mindanao: Agko, Mt. Apo, on dead leaves, 3-VIII-1979, S. Okajima (**Okajima**).

Distribution (Fig. 103). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo.

Host. dead leaves.

Genus *Podothrips* Hood

Podothrips Hood, 1913b: 67-70.
Type species: *Podothrips semiflavus* Hood, by monotypy.

Diagnosis. Head always longer than wide. Ocelli well developed. Eyes moderately developed.. Antennae 8-segmented; segment III with 1 or 2 sense cones; segment IV with 2 or 3 sense cones. Maxillary stylets long and slender, retracted into head, maxillary bridge present. Mouthcone very short.

Pronotum with reduced anteromarginal setae; midlateral setae developed, sometimes reduced; epimeral sutures complete. Praepectal plates developed, longer than wide. Forefemora each with or without a basal hump on inner margin; foretibiae each with tooth, or seta-bearing tubercle at apex. Foretarsal tooth broadly based. Macropterous brachypterous, or apterous. Forewings, when present, constricted medially, with duplicated cilia. Metathoracic sternopleural sutures present.

Pelta various, semicircular to bell- or hat-shaped. Abdominal tergites II-VII each with 2 pairs of sigmoid, wing retaining setae in macropterae. Males without glandular area on sternite VIII. Tube usually shorter than head. Anal setae well developed.

Species of *Podothrips* are distributed throughout the tropics and subtropics in association with various grasses. Adults of some species are predatory on scale insects. These medium-sized, brown or bicolored thrips are closely related to those of *Karnyothrips* Watson (Ritchie, 1974). Twenty one species are included in this genus (Ritchie, 1974; Okajima, 1978). Two species *P. lucasseni* (Kruger) and *P. dichromatus* n. sp. are known from the Philippines.

Key to Philippine species of *Podothrips* Hood

1 Forefemora each with basal hump on inner margin; posteroangular setae about as long as epimeral setae; body brown .... *P. lucasseni* (Kruger)

1' Forefemora without basal hump on inner margin; posteroangular setae reduced (Fig. 102b); body bicolored .... *P. dichromatus*, n. sp.

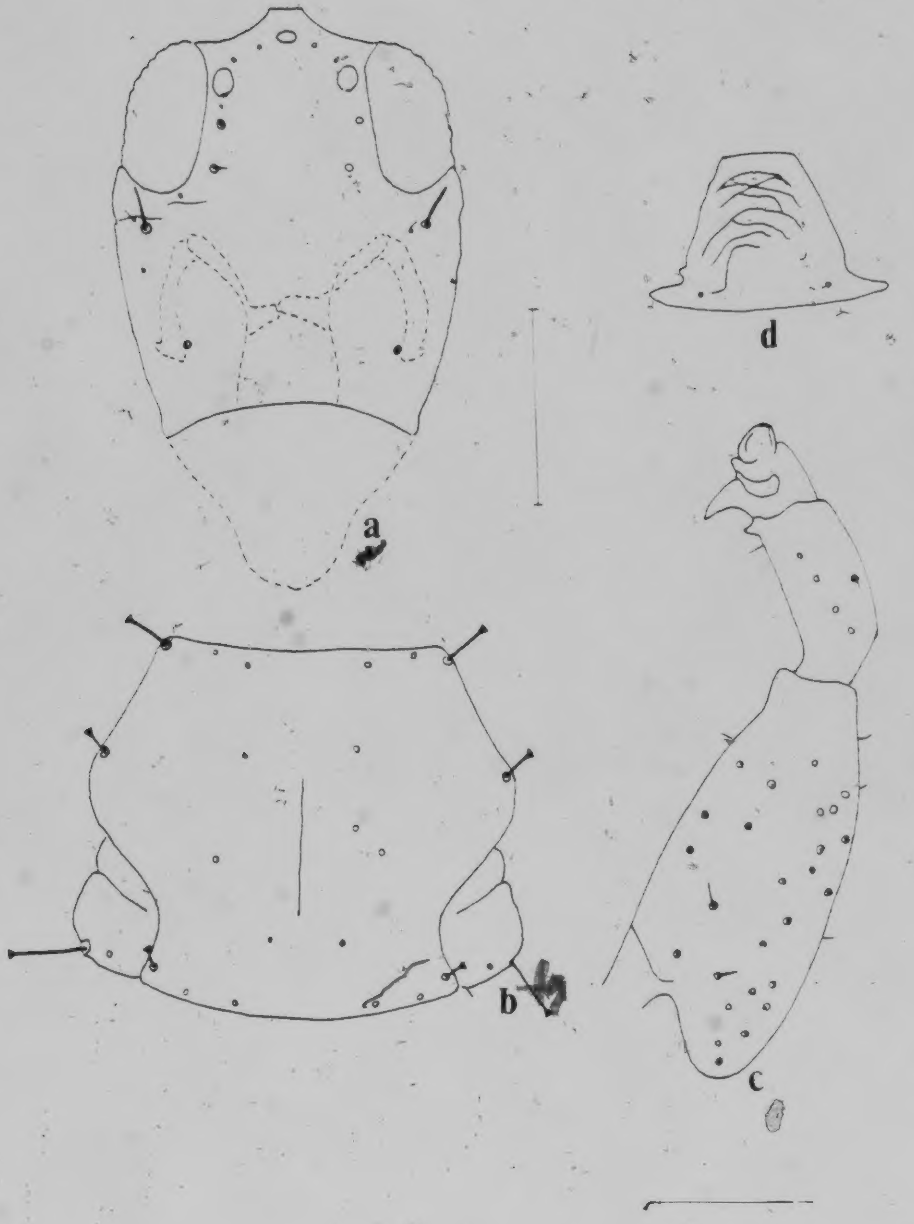
***Podothrips dichromatus*, n. sp.**
Holotype female, Philippines: Visayas: San Antonio, Cebu City (**UPLB**)
Figure 102a, b, c, d

Diagnosis. Body bicolored. Head, thorax, abdominal tergites VIII to IX and tube brown, base and apex of tube pale; pelta, tergites II, VI and VII uniformly yellow. Postocular setae reduced, with blunt apices. Antennal segments III and IV yellow, each with 2 sense cones respectively. Pronotal anteromarginal setae vestigial; midlateral setae well developed, with expanded apices. Legs bicolored; forefemora slightly enlarged; foretibiae and tarsi each with a tooth. Pelta bell-shaped. Wing retaining setae on tergites II to VII reduced. Tube shorter than tube.

This species differ from *P. lucasseni* in the following characteristics: body bicolored; forefemora each lack basal hump on inner margin, and posteroangular setae reduced. This species is known only from the type material.

Female macroptera. Head brown, longer than wide, widest behind eyes; narrowest at base (Fig. 102a). Ocelli small. Eyes about one-quarter of head length.. Postocular setae short, with blunt apices. Antennal segment I brown; II yellow with dark lateral margins; III and IV yellow; V and VI yellowish with brown apices; VII brown with pale base; VIII brown, constricted at base; segments III and IV each with 2 sense cones. Mouthcone rounded (Fig. 102a).

Pronotum brown; major setae with expanded apices; anteromarginal setae vestigial; anteroangular setae longer than posteroangular; midlateral setae developed, with expanded apices; epimeral setae developed (Fig. 102b). Forefemora slightly enlarged, brown with yellow apices; foretibiae yellowish with brown lateral margins, each with small tooth apically; foretarsi yellow, each with stout tooth (Fig. 102c); mid and hindlegs yellow. Forewings pale (damaged); subbasal wing setae subequal, expanded apically. Pterothorax brown laterally, yellowish brown medially. Meso and metanota slightly reticulate.


a
b
c
d

Pelta bell-shaped, reticulate; pair of campaniform sensilla present (Fig. 102d). Abdominal tergites I to VII yellow; VIII yellowish anteriorly, brown posteriorly; IX brown. Tergites II to VII each with 2 pairs of reduced wing retaining setae. Tergites III to V each with small median, dark patch anteriorly. B1 setae of tergite IX shorter than tube, with blunt apices. Tube dark brown, conical, longer than head, with pale base and apex. Anal setae longer than tube.

Dimensions (holotype female; um). Body length (extended) 2264.4. Head length 204, median width 183.6; dorsal eye length 66.3; postocular setae length 22.1; antennal segments length: I 25.5; II 49.3; III 47.6; IV 51; V 51; VI 45.9; VII 45.9; VIII 39.1. Pronotum length 190.4, median width 217.6, major setae: aa 25.5. ml 16.2, pa 18.7, ep 35.7. Tergite IX setae: B1 79.9, B2 32.3, B3 6.8. Tube length: 25.8.

Type data. **Holotype** female, PHILIPPINES: Visayas: San Antonio, Cebu city, on leaf sheath of *Bambusa* sp., 28-IV-1987, I. Lit (**UPLB**).

Male. Unknown.

Material examined. **Holotype** only (**UPLB**).

Etymology. Dichromatus is a Greek word meaning "bicolored" in reference to the color of the body of this thrips.

Distribution (Fig. 103). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: San Antonio, Cebu city.

Host. leaf sheath of *Bambusa* sp.

***Podothrips lucasseni* (Kruger)**
Phloeothrips lucasseni Kruger, 1890: 105-106.
Syntypes female, male, Indonesia: Java (?**Lost**).
Podothrips oryzae Priesner; Ritchie, 1974: 261.

Diagnosis. Body brown. Body setae yellowish. Head rounded anteriorly, narrowest at base. Postocular setae shorter than dorsal length of eyes, with knobbed apices. Antennal segments III to VII yellow; segment III with 1 or 2 sense cones; IV with 2 or 3 sense cones. Pronotal major setae developed, with knobbed apices. Legs bicolored. Forefemora with basal hump on larger individuals; foretibiae with small tooth on inner margin at apex; foretarsi with stout tooth. Forewings clear, without duplicated cilia.

Female macroptera. Head rounded anteriorly, longer than wide, widest behind eyes, narrowest at base. Ocelli small. Eyes about 0.35 times as long as head. Postocular setae shorter than dorsal length of eyes, knobbed apically. Antennal segment I brown, yellow at base; II brown on basal half, yellow on apical half; III to VII yellow; VIII greyish; segment III with 1 or 2 sense cones; IV with 2 or 3 sense cones. Mouthcone rounded.

Pronotum with distinct median longitudinal line; major setae well developed, knobbed apically; anteroangular setae longer than anteromarginals; posteroangular and epimeral setae subequal. Femora brown; tibiae and tarsi yellow; forefemora each with basal hump in larger individuals; foretibiae each with small tooth on inner margin at apex; foretarsi each with stout tooth. Forewings clear; duplicated cilia absent; subbasal wing setae developed; setae S3 longest. Meso and metanota smooth.

Pelta triangular; pair of campaniform sensilla present. Abdominal tergites II to VII each with 2 pairs of wing retaining setae; anterior margin of tergites in form of small, scallop-like reticulation. B1 setae on tergite IX shorter than tube, pointed apically. Tube conical, shorter than head. Anal setae well developed.

Male macroptera. Similar to female in general structure and color but smaller.

Material examined. 2 females, Victorias, Negros Occidental, on cane leaf, 13-IX-1927, W. D. Pierce; 1 male, Victorias, Negros Occidental, host unknown, 8-XI-1929, and 1 female, I-1928, W. D. Pierce (Moulton Coll.) (**CASC**); 4 females, 4 males, Luzon: Bicol Expt. Sta., Pili, Camarines Sur, in leaf sheath of *Oryza sativa* (IRRI var 66), 5-VI-1987, C. P. Reyes (**CPRC**).

Distribution (Fig. 103): The known range of this species extends from India eastward to the Indo-Australian Archipelago and to Australia and the Hawaii Islands. In the Philippine Archipelago, this species is known from the islands of Luzon and Visayas.

PHILIPPINES: Luzon: Bicol Expt. Sta., Pili, Camarines Sur; Visayas: Victorias, Negros Occidental. INDONESIA: Java. MALAYSIA. THAILAND. JAPAN. BANGLADESH. INDIA. AUSTRALIA: Queensland. U.S.A.: Hawaii.

Hosts. leaf sheath of *Oryza sativa* (IRRI var 66), sugarcane, leaf sheaths of sugarcane, leaf of cane, paddy rice, [rice] pot culture, on Amyrallidaceae, grass, *Andropogon pertusus*, *Triticum* sp., sweeping grass, grass tussocks. Individuals of *P. lucasseni* were found in considerable number in vegetative and preflowering stages of rice plants in Pili, Camarines Sur.

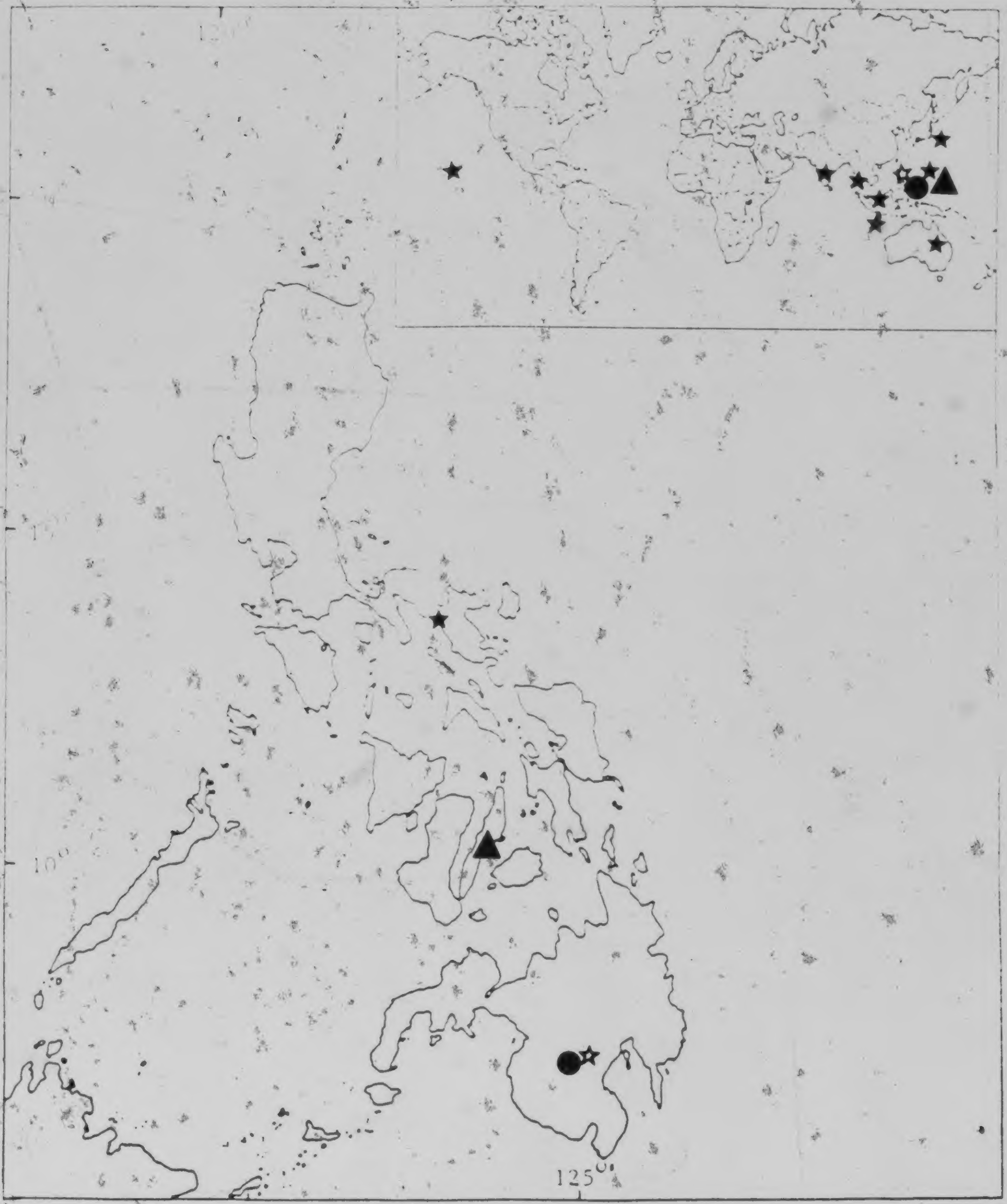
Fig. 103. Distribution of *Plectrothrips* species and *Podothrips* species in the Philippines, and world.

☆ *Plectrothrips* sp. 1

● *Plectrothrips* sp. 2

▲ *Podothrips dichromatus*, n. sp.

★ *Podothrips lucasseni*, n. sp.


10°
125°

Genus *Praeciputhrips* n. gen.
Type species: *Praeciputhrips balli* n. sp.

Diagnosis. Head reticulate, slightly constricted towards base. Ocellar setae fine. Eyes with posterior ommatidia enlarged. Postocular setae developed, longer than the dorsal length of eyes, with blunt apices. Cheek setae small. Antennae 8-segmented; segment III with 1 moderately stout sense cone; segment IV with 3 moderately stout sense cones; VII parallel-sided in apical three quarters; VIII slightly constricted at base. Maxillary stylets retracted far into head, extended to level of postocular setae and almost touched in middle of head. Maxillary bridge absent. Mouthcone rounded, labrum pointed.

Pronotum fairly smooth, with major setae developed; anteromarginal setae longer than posteroangulars, epimeral and posteroangular setae subequal in length. Epimeral sutures complete. Praepectal plates absent; probasisternum divided. Forefemora enlarged; foretarsi without tooth. Forewings parallel-sided, with duplicated cilia; metascutum with elongate band of reticulation.

Pelta flask-shaped, reticulate medially and with pair of campaniform sensilla. Abdominal tergites II-VII each with 2 pairs of wing retaining setae; tergite IX with B1 setae about as long as tube. Tube shorter than head. Males without glandular areas on sternite VIII. Sternite VIII without glandular areas in males.

Adults of *Praeciputhrips* are bicolored thrips with moderately stout, antennal sense cones. They resemble *Hoplandrothrips* Hood species in having an elongate band of reticulation on the metascutum, maxillary stylets retracted far into head and almost touching medially and a bicolored body. *Praeciputhrips* adults differ from those of *Hoplandrothrips* in having 1 outer sense cone on antennal segment III and 1 inner and 2 outer sense cones on segment IV, and by their parallel sided forewings which are characteristic of *Liothrips* and related genera. In the *Liothrips*-genus group, only adults of *Psephenothrips*, n. gen. have maxillary stylets similar to those of *Praeciputhrips*, n. gen. *Praeciputhrips* n. gen.

species also have enlarged posterior ommatidia in their eyes as do those of *Rosingothrips* n. gen. and *Gemmathrips* n. gen.

Etymology. Praecipu is a Greek word meaning "strange" (*Praeciputhrips* = strange thrips) referring to the unusual color of the body and position of maxillary stylets of these thrips. All known members of *Liothrips*-genus-group are uniformly brown, dark brown or black with their maxillary stylets usually retracted halfway and forming a U in the head.

***Praeciputhrips balli*, n. sp.**
Holotype female, Philippines: Visayas: Sipit Saburan Puerto Gallera, Oriental Mindoro (**UPLB**)
Figure 104a, b, c, d

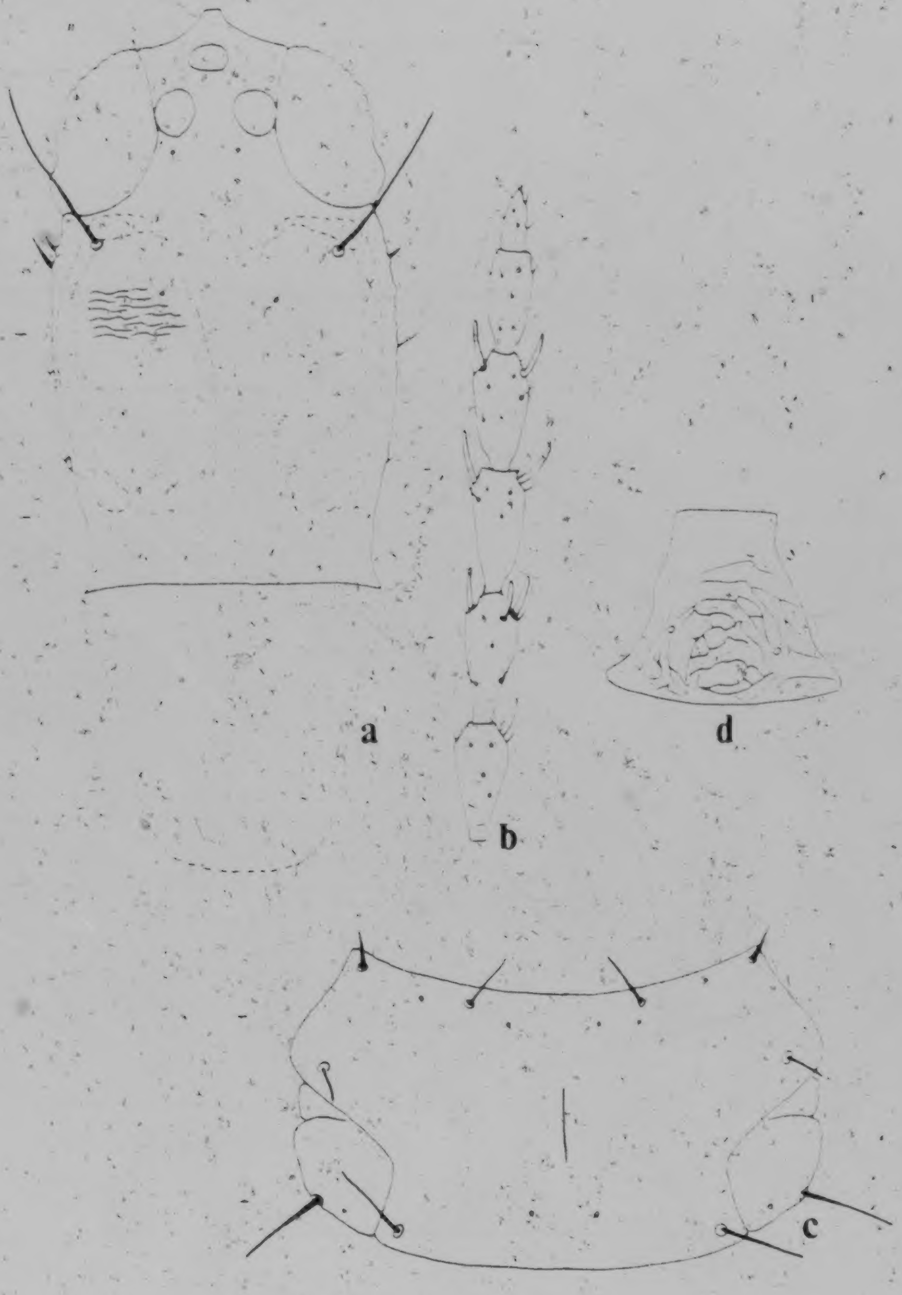
Diagnosis. Body bicolored. Head, pronotum, abdominal tergites VII to IX and basal half of tube yellowish brown to brown; meso and metanota, pelta, tergites II to VI and apex of tube yellow. Ocellar setae vestigial. Eyes with enlarged posterior ommatidia. Postocular setae longer than dorsal length of eyes, with blunt apices. Antennal segment III with 1 outer sense cone; IV with 1 inner and 2 outer sense cones respectively. Pronotal major setae well developed, with blunt apices. Forewings pale in basal third, brown on apical two-thirds. Pelta triangular. Tube shorter than head.

This species is unique among members of the *Liothrips*-genus group in having an elongate band of reticulation on the metanotum and a bicolored body. Members of *P. balli*, n. sp. resemble those of *P. strasseni*, n. sp. in having maxillary stylets almost reaching the eyes and lying closely in the middle of the head, and postocular setae well developed. This species differ from the latter in the following characteristics: posterior ommatidia of each compound eye enlarged; antennal sense cones moderately stout; pronotal major setae reduced; and by the shape of head, mouthcone and pelta.

Female macroptera. Head dark brown laterally, brown medially, about 2.0 times as long as wide, slightly constricted at base; reticulate (Fig. 104a). Ocellar setae vestigial. Eyes with enlarged posterior ommatidia. Postocular setae well developed, longer than dorsal length of eyes, with blunt apices. Cheeks setae moderately strong. Antennal segments I, II, VII and VIII brown; II with pale apex; III to V yellow; segment III with 1 outer sense cone; IV with 1 inner and 2 outer sense cones; VI yellow on basal third, light brown on apical third; VIII slightly constricted at base (Fig. 104b). Mouthcone rounded (Fig. 104a).

Pronotum transverse, brown, smooth; major setae with blunt apices; anteromarginal setae longer than anteroangulars; midlateral setae slightly longer than anteroangulars;

Fig. 104. *Praeciputhrips balli*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta


a
b
d
c

posteroangular setae a little shorter than epimerals (Fig. 104c). Femora slightly enlarged; forefemora brown; foretibiae yellowish brown; foretarsi yellow and without tooth; mid and hindfemora brownish yellow; mid and hindtarsi brown, with yellow apices; tarsi pale. Forewings pale in basal third, shaded with brown on apical two thirds; 14 duplicated cilia; subbasal wing setae well developed, with blunt apices. Meso and metanota yellowish brown. Metanotum longitudinally reticulate.

Pelta yellow, flask-shaped, reticulate; pair of campaniform sensilla present (Fig. 104d). Abdominal tergites II to VI yellow medially, brownish laterally; anterior margin darkened medially; tergites VII to IX brown. Tergites II to VII each with 2 pairs of slightly curved wing retaining setae; tergal lateral setae pale, with blunt apices. B1 setae of tergite IX shorter than tube, pointed apically. Tube dark brown in basal half, pale on apical half; shorter than head. Anal setae moderately developed.

Dimensions (holotype female; um). Body length (extended) 2774.4. Head length 299.2, median width 190.4, dorsal eye length 91.8; postocular setae length 105.4; antennal segments length: I 52.7; II 59.5; III 68; IV 76.5; V 71.4; VI 71.4; VII 61.2; VIII 35.7. Pronotum length 183.6, median width 275.4, major setae: aa 32.3, am 47.6, ml 30.6, pa 77.4, ep 78.2. Tergite IX setae: B1 190.4, B2 47.6, B3 193.8. Tube length 193.8.

Type data. **Holotype** female, PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro, on leaves of unknown tree, 19-VI-1987, C. P. Reyes (**UPLB**). **Paratypes** (2 females, 3 males) same data as holotype (**UPLB**).

Male macroptera. Similar to female in general structure but smaller. Legs predominantly brown; tibiae with yellow apices; tarsi light brown. Pronotal posteroangular and epimeral setae shorter.

Dimensions (allotype male; um). Body length (extended) 2312. Head length 251.6, median width 180.2; dorsal eye length 91.8; postocular setae length 102; antennal segments length: I 51; II 54.4; III 61.2; IV 71.4; V 64.6; VI 68; VII 57.8; VIII 34.

Pronotum length 142.8, median width 278.8, major setae: aa 30.6, am 17, ml 42.5, pa 61.2, ep 68. Tergite IX setae: B1 173.4; B2 34; B3 180.2. Tube length 180.2.

Material examined. Type series only (**UPLB**).

Etymology. This species is named after Dr. George E. Ball, a carabid beetle systematist par excellence, for his guidance and for serving as member of my Ph. D. advisory committee.

Distribution (Fig. 108). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro.

Host. leaves of unknown tree

Genus *Praepodothrips* Priesner & Seshadri

Praepodothrips Priesner & Seshadri, 1952: 407-410.
Type species: *Praepodothrips indicus* Priesner & Seshadri, by original designation

Diagnosis. Head moderately large, slightly reticulate laterally. Antennal segment III with 1 sense cones, 3 in few taxa; segment IV with 2 sense cones, 5 in few taxa; postocular setae long, with pointed to expanded apices; maxillary stylets retracted into head, not reaching level of postoculars; maxillary bridge present. Mouthcone rounded.

Pronotum shorter than or about as long as head; anteromarginal setae vestigial; midlateral setae reduced to vestigial. Epimeral sutures complete; praepectal plates present. Forefemora enlarged; foretarsi each with tooth. Forewings constricted at middle, with duplicated cilia in macropters.

Pelta hat-shaped with pair of campaniform sensilla. Abdominal tergites II-VII each with 2 pairs of wing retaining setae; tergite IX with B1 setae pointed. Tube conical.

Praepodothrips includes 4 species of grass inhabiting thrips which are usually large, brown or bicolored and are closely related to *Haplothrips* (Pitkin, 1976). Members of *Prepodothrips* are distinguished from those of *Haplothrips* by the following characteristics: antennal segment IV usually with 2 sense cones rather than 4; pronotal anteromarginal and midlateral setae always vestigial and body larger. One new species, *P causiapeltus*, is described from the Philippines.

***Praepodothrips causiapeltus*, n. sp.**
Holotype female, Philippines: Palawan: Brooks Point (UPLB)
Figure 105a, b, c, d

Diagnosis. Body brown. Body setae brownish, with expanded apices. Ocelli moderately developed. Postocular setae shorter than dorsal length of eyes, with expanded apices. Cheek setae 2 pairs, moderately stout. Antennal segments III and IV with 3 and 2 sense cones respectively. Legs bicolored. Forewings pale, each with 6 duplicated cilia. Pelta hat-shaped. Tube shorter than head.

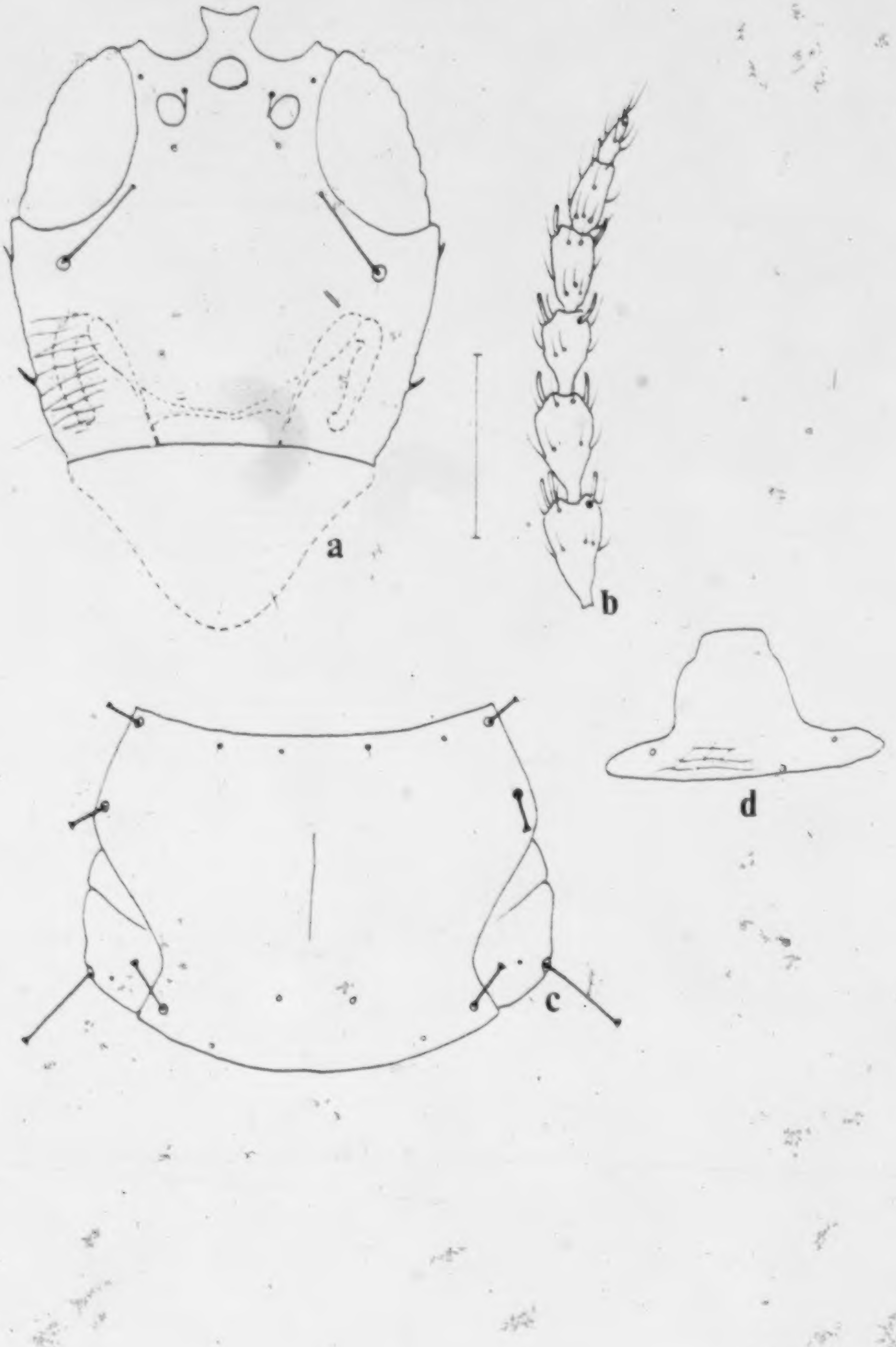
This species is similar to the Indian species *P. cymbapogoni* Ananthakrishnan in the following characteristics: body brown; antennal segments III to VI yellow and 5 to 6 duplicated cilia on forewings. Members of *P. causiapeltus*, n. sp. differ from the latter in the shape of the head and pelta; 3 sense cones rather than 1 on antennal segment III, and 2 rather than 1 on IV; mid and hindtibiae brown, and postocular setae with expanded apices.

Female macroptera. Head rounded on anterior angles, widest behind eyes; transversely striate (Fig. 105a). Ocelli moderately developed. Eyes about one-third as long as head. Postocular setae shorter than dorsal length of eyes, with expanded apices. Cheeks setae 2 pairs, moderately stout. Antennal segments I and II brown; III to VI yellowish; VII to VIII brownish; segment III and IV with 3 and 2 sense cones respectively (Fig. 105b). Mouthcone rounded (Fig. 105a).

Pronotum smooth; major setae with expanded apices; anteromarginal setae minute; midlateral setae longer than anteroangulars; epimeral setae longer than posteroangulars (Fig. 105c). Femora brown; foretibiae yellowish; mid and hindtibiae brown; tarsi yellow; foretarsi each with small tooth. Forewings pale, with 5 to 6 duplicated cilia; subbasal wing setae well developed, expanded apically. Meso and metanota slightly reticulate; median setae small.

Pelta hat-shaped, reticulate; pair of campaniform sensilla present (Fig. 105d). Abdominal tergites II to VII each with 2 pairs of wing retaining setae; anterior pair simple;

Fig. 105. *Praepodothrips causiapeltus*, n. sp., female holotype. a. Head. b. Right antennal segments III to VIII. c. Pronotum. d. Pelta.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posterior pair sigmoidal. B1 setae of tergite IX shorter than tube, pointed at apex. Tube conical, shorter than head. Anal setae well developed.

Dimensions (holotype female; um). Body length (extended) 1863.2. Head length 224.4, median width 207.4; dorsal eye length 91.8; postocular setae length 57.8; antennal segments length: I 30.6, II 49.3, III 59.5, IV 61.2, V 47.6, VI 44.2, VII 40.8, VIII 34. Pronotum length 180.2, median width 231.2, major setae length: aa 27.2; ml 30.6; pa 42.5; ep 54.4. Tergite IX setae: B1 98.6; B2 28.9; B3 88.4. Tube length 136.

Type data. Holotype female, PHILIPPINES: Palawan: Brooks Point, on leaf sheath of *Bambusa* sp. 29-I-1985, C. P. Reyes (**UPLB**). **Paratypes** (5 males) same data as holotype (**UPLB**).

Male macroptera. Similar to female in color and structure but body smaller. Pronotal posteroangular and epimeral setae and B setae on tergite IX shorter.

Dimensions (allotype male; um). Body length (extended) 1761.2. Head length 221, median width 190.4; dorsal eye length 85; postocular setae length 52.7; antennal segments length: I 32.2; II 44.2; III 61.2; IV 61.2; V 51; VI 42.5; VII 42.5; VIII 32.3. Pronotum length 158.1; median width 210.8; major setae length: aa 27.2; ml 30.6; pa 35.7; ep 51. Tergite IX setae: B1 96.9; B2 25.5; B3 45.1. Tube length 125.8.

Material examined. Type series only (**UPLB**).

Etymology. Causiapeltus is a combination of the Latin causia and pelta meaning "broad brimmed hat" and "small shield" respectively and refers to the shape of the pelta or abdominal tergite I of these thrips.

Distribution (Fig. 108). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Palawan. PHILIPPINES: Palawan: Brooks Point.

Host. leaf sheath of *Bambusa* sp.

Genus *Proaliothrips* n. gen.

Type species: *Proaliothrips moundi* n. sp.

Diagnosis. Head longer than wide gradually narrowed towards base. Eyes about one third as long as head. Postocular setae well developed, rounded at apices. Cheek setae slender. Antennae 8-segmented; segment III with 1 moderately stout sense cones; segment IV with 2 moderately stout sense cones. Maxillary stylets retracted into head, extended level of postocular setae. Mouthcone narrowly rounded.

Pronotum transverse; major setae developed, with knobbed apices; epimeral setae longer than posteroangulars; epimeral sutures complete. Praepectal plates (?)absent. Forefemora enlarged in both sexes; foretarsi each with triangular tooth in males, absent in females; forewings parallel-sided, with duplicated cilia.

Pelta broadly triangular, reticulate, with pair of campaniform sensilla. Abdominal tergites II- VII each with 2 pairs of wing retaining setae; tergite IX with B1 setae longer than tube. Tube about as long as head. Sternite VIII without glandular areas in males.

Adults of this genus resemble those of *Aliothrips* Priesner (not known in the Philippines) in having enlarged forefemora and a foretarsal tooth in the males. *Proaliothrips* species are readily distinguished from those of *Aliothrips* by their moderately stout sense cones on antennal segments III to VII, segment VI much shorter than segment III and by the shape of their antennal segments. Females lacks a foretarsal tooth. Members of *Aliothrips* have armed tarsi in both sexes, long and setiform sense cones on antennal segments III and IV, and their antennal segment III is shorter than VI.

Etymology. Pro is a Latin prefix meaning "near" (*Proaliothrips* = near *Aliothrips*).

Proaliothrips moundi, n. sp.
Holotype male, Philippines: Visayas: La Castellana, Negros Occidental (**UPLB**)
Figure 106a, b, c, d

Diagnosis. Body dark brown. Body setae pale, with knobbed apices. Head gradually narrowed towards base. Postocular setae developed, with knobbed apices. Cheek setae slender. Antennal segment III slender, vasiform, about as long as segment IV, with 1 and 2 moderately long sense cones respectively. Major setae of pronotum with knobbed apices. Legs predominantly brown; forefemora greatly enlarged. Forewings pale, with duplicated cilia. Pelta broadly triangular. Tube about as long as head.

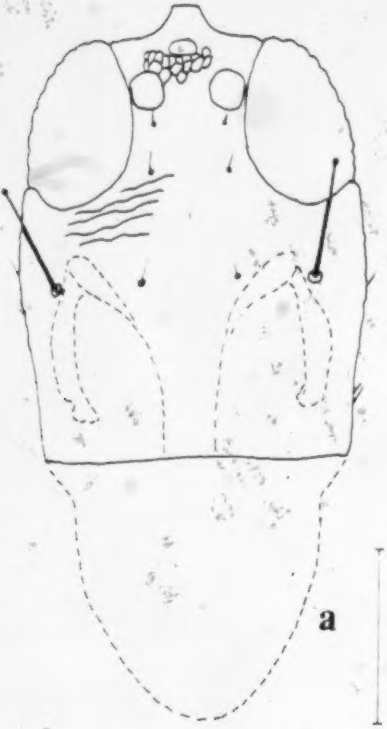
Adults of this species differ from those of *Aliothrips* in the shape of head, antennal segments and pelta; moderately stout sense cone on antennal segments III to VII, and lack of a foretarsal tooth in females.

Male macroptera. Head longer than wide, gradually narrowed towards base; transversely striate (Fig. 106a). Ocellar hump small. Eyes about one third as long as head. Postocular setae shorter than dorsal length of eyes, knobbed at apex. Cheeks setae slender. Antennae less than 2.0 times as long as head; segments I, II, VII and VIII brown; III to VI yellowish with darker margins; III vasiform, about as long as segment IV; segments III with outer sense cone; IV to VII with 1 inner and 1 outer sense cones (Fig. 106b). Mouthcone elongate, rounded (Fig. 106a).

Pronotum widely reticulate; major setae with knobbed apices; anteromarginal setae slender; anteroangular setae slightly longer than epimerals; epimeral setae longer than posteroangulars (Fig. 106c). Legs generally brown; foretibiae brownish yellow; mid and hindtibiae with pale apices; tarsi yellow; foretarsi each with a triangular tooth. Forewings pale, each with 15 to 17 duplicated cilia; subbasal wing setae pale, developed, with knobbed apices. Meso and metanota reticulate.

Pelta broadly triangular, reticulate; campaniform sensilla present (Fig. 106d). Abdominal tergites II to VII each with 2 pairs of slightly curved wing retaining setae; tergal

Fig. 106. *Proaliothrips moundi*, n. sp., male holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta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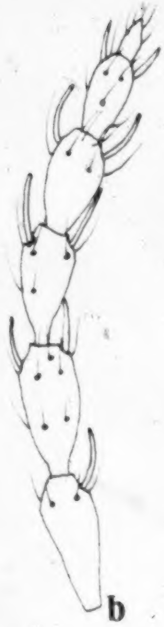
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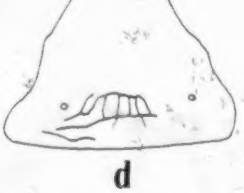
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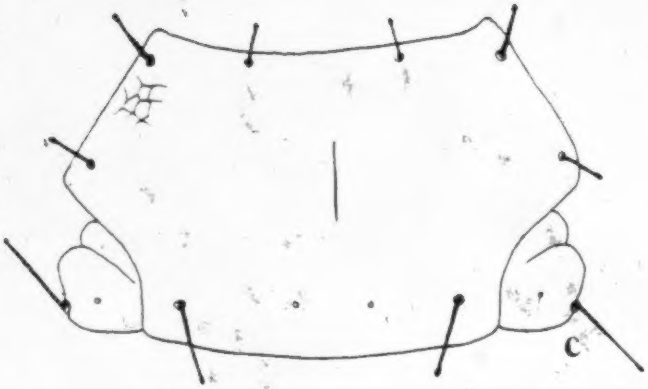
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lateral setae developed, pale with knobbed apices. B1 setae of tergite IX slender, longer than tube, pointed apically. Tube about as long as head. Anal setae shorter than tube.

Dimensions (holotype male; um). Body length (extended) 2,128. Head length 210.8, median width 183.6, dorsal eye length 86.7; postocular setae length 68; antennal segments length: I 42.5, II 54.4, III 71.4, IV 71.4, V 61.2, VI 52.7, VII 44.2, VIII 32.3. Pronotum length 183.6, median width 255, major setae: aa 42.5, am 42.5, ml 39.1, pa 85, ep 110.5. Tergite IX setae length: B1 204; B2 27.2; B3 61.2. Tube length 210.8.

Type data. **Holotype** male, PHILIPPINES: Visayas: La Castellana, Negros Occidental, on galled leaves of *Coffea arabica*, 14-V-1985, C. P. Reyes (**UPLB**). **Paratypes** (3 males, 1 female) same data as holotype (**UPLB**)

Female macroptera. Similar to male in color and body structure but larger. Antennal segment VII yellowish basally. Forefemora moderately enlarged; foretarsi without tooth. Forewings each with 12 duplicated cilia.

Dimensions (allotype female; um). Body length (extended) 1659.2. Head length 236.3, median width 200.6, dorsal eye length 88.4; postocular setae length 85; antennal segments length: I 47.6; II 56.8; III 71.4; IV 71.4; V 61.2; VI 57.8; VII 51; VIII 30.6. Pronotum length 170, median width 278.8, major setae: aa 30.6, am 37.4, ml 39.1, pa 85, ep 110.5. Tergite IX setae length: B1 187; B2 30.6; B3 192.1. Tube length 214.2.

Material examined. Type series only (**UPLB**).

Etymology. This species is named after Dr. Laurence A. Mound, a world authority on thrips, for unselfishly sharing his expertise.

Distribution (Fig. 108). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: La Castellana, Negros Occidental.

Host. galled leaves of *Coffea arabica*

Genus *Prosolomonthrips* n. gen.

Type species: *Prosolomonthrips mindori* n. sp.

Diagnosis. Head slightly longer than wide wide, reticulate, slightly constricted towards base; eyes large, about one-half of head length. Median setae prominent. Postocular setae well developed, expanded apically. Antennae 8-segmented; segment III with 1 inner and 1 outer sense cones; segment IV with 1 inner and 2 outer sense cones; segment VIII constricted at base. Maxillary stylets very short, confined to mouthcone; maxillary bridge absent. Mouthcone narrowly rounded.

Pronotum about 2.0 times as wide as long, with fine reticulation; major setae developed, expanded apically; median lateral setae closer to anteroangulars; epimeral sutures complete. Praepectal plates present; probasisternum fused at middle, almost entire; mesopraesternum boat-shaped. Foretarsi without tooth. Forewings slender, ?without duplicated cilia. Metascutum with elongate, triangular band of reticulation, notched medially on either side.

Pelta rounded, with pair of campaniform sensilla. Abdominal tergites II-VIII each with 2 pairs of wing retaining setae. Tergite IX with B1 setae shorter than tube, expanded apically. Tube shorter than head. Sternite VIII without glandular areas in males.

Adults of *Prosolomonthrips* species are similar to those of *Solomonthrips* Mound and *Phylladothrips* Priesner in possessing 2 pairs of wing retaining setae on tergite VIII. Members of *Solomonthrips* and *Prosolomonthrips* have an elongate, triangular band of reticulation on the metascutum. Members of *Prosolomonthrips* differ from those of the other two genera in not having a maxillary bridge; maxillary stylets practically confined to the mouthcone; epimeral sutures complete; pronotal anteroangular and midlateral setae well developed and pelta rounded. Adults of *Phylladothrips* species sometimes have moderately broad maxillary stylets retracted far into the head.

Etymology. Pro is a Latin prefix meaning "near" (*Prosolomonthrips* = near *Solomonthrips*).

Prosolomonthrips mindori, n. sp.
Holotype male, Philippines: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro (UPLB)
Figure 107a, b, c,d, e

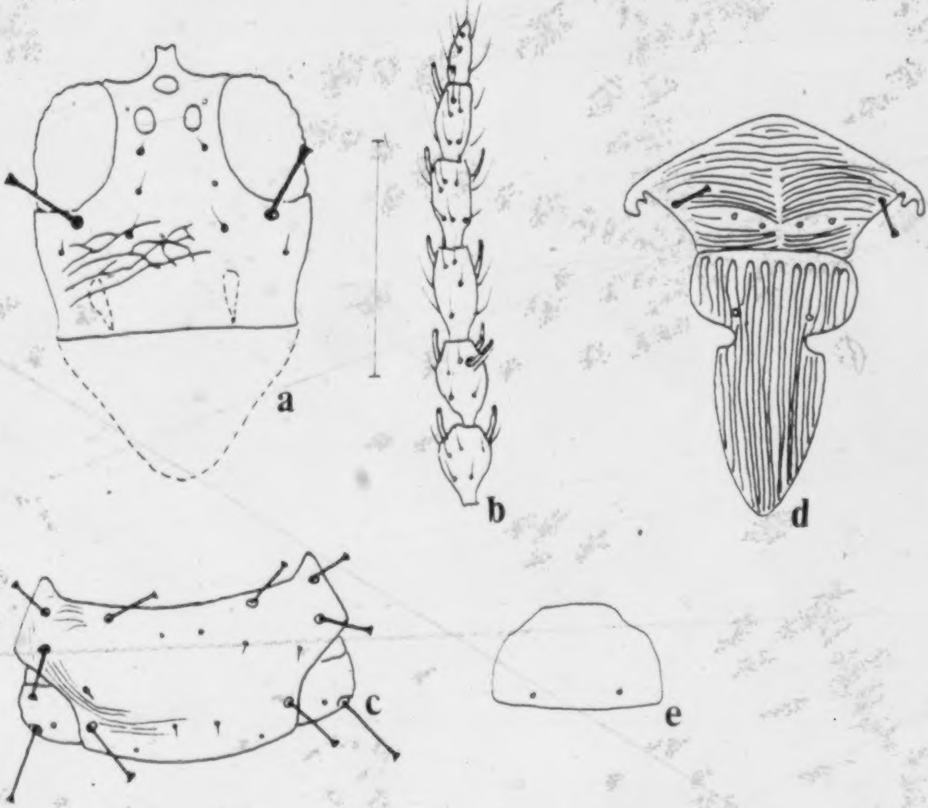
Diagnosis. Body small bicolored. Body setae with expanded apices. Head, pro and mesonota, anterior three quarters of metanotum, abdominal tergites VIII to IX and tube light brown to brown; posterior quarter of metanotum, tergites II to VII yellowish. Head reticulate except base smooth. Postocular setae developed, with expanded apices. Antennal segments IV to VI of about equal length; segments III and IV with 2 and 3 sense cones respectively. Pronotum about 2.0 times as wide as long ; major setae developed. Legs bicolored. Forewings slender; fringe cilia brownish. Pelta rounded. Tergites II to VIII each with dentate reticulation laterally; wing retaining setae 2 pairs. Tube shorter than head.

Members of this species are among the few known phlaeothripids having wing retaining setae on abdominal tergite VIII. In addition to differences mentioned in the generic description, members of this species differ from those of *Solomonthrips* in the shape of antennal segments, 3 rather than 2 sense cones on antennal segment IV, cheeks not constricted behind eyes, forefemora not enlarged, and foretarsal tooth absent.

Male macroptera. Head brown, slightly longer than wide, reticulate except base smooth; median setae 3 pairs (Fig. 107a). Eyes about one half of head length; posterior ommatidia slightly enlarged. Postocular setae shorter than dorsal length of eyes, with expanded apices. Cheeks narrowed towards base. Antennal segments I, II, VII and VIII brown, III yellowish and pedicellate; IV to VI brown with pale bases, of about equal length; VIII elongate; segment III with 1 inner and 1 outer sense cones; IV with 1 inner and 2 outer sense cones (Fig. 107b). Mouthcone narrowly rounded (Fig. 107a).

Pronotum brown, about twice as wide as long; reticulate laterally, smooth medially; anteromarginal setae slightly longer than anteroangulars; midlateral setae close to

Fig. 107. *Prosolomonthrips mindori*, n. sp., male holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Meso and metanotal sculpture e. Pelta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anteroangulars; epimeral setae longer than posteroangulars (Fig. 107c). Fore and midfemora brown with pale apices; fore and midtibiae yellow, with dark margins; tarsi pale; foretarsi without tooth; hindlegs yellow, with dark margins. Forewings slender, yellow; fringe cilia brown. Meso and metanota brown . Mesonotal median sculpture with "psuedosplit' posteriorly; lateral setae well developed, with expanded apices (Fig. 107d). Metascutum with elongate, triangular band of reticulation, notched medially on either side (Fig. 107d).

Pelta broadly triangular; ?smooth; a pair of campaniform sensilla present (Fig. 107e). Abdominal tergites II to VII yellowish; VIII to IX pale brown. Tergites II to VIII each with a dentate reticulation laterally and 2 pairs of wing retaining setae; posterior pair on tergites V to VII lanceolate; those on VIII simple, anterior pair stouter and longer than posterior pair; tergal lateral setae with expanded apices. B1 setae of tergite IX shorter than head, with expanded apices; B2 setae with pointed apices. Tube brown, shorter than head. Anal setae well developed.

Dimensions (holotype male; um). Body length (extended) 1047.2. Head length 119, median width 114.9; dorsal eye length 54.4; postocular setae 30.6; antennal segments length: I 20.4, II 30.6, III 30.9, IV 35.7, V 35.7, VI 35.7, VII 33.2, VIII 27.2. Pronotum length 69.7, median width 144.5, major setae: aa 18.7, am 23.8, ml 25.5, pa 28.9, ep 34. Tergite IX setae length: B1 49.3, B2 25.5, B3 28.9. Tube length 88.4.

Type data. Holotype male, PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro, on *Bambusa* sp., 20-VI-1987, C. P. Reyes (**UPLB**).

Female. Unknown.

Material examined. Holotype only (**UPLB**).

Etymology. Mindori refers to Mindoro the type locality of this thrips.

Distribution (Fig. 108). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro.

Host. *Bambusa* sp.

Genus *Psalidothrips* Priesner

Psalidothrips Priesner, 1932c: 61-62.
Type species: *Psalidothrips amens* Priesner, by monotypy.

Diagnosis. Head as long as wide. Postocellar setae short. Eyes developed, rounded Postocular setae close to eyes. Cheeks rounded, sometimes incut just behind eyes. Antennae 8-segmented; segments III and IV with 1 inner and 1 outer sense cones respectively. Maxillary stylets usually not deeply retracted into head capsule, in form of V or U in head; maxillary palpi small, slightly longer than labial palpi. Mouthcone short, rounded.

Pronotum with anteroangular and anteromarginal setae minute; posteroangular setae longest; epimeral sutures complete; praepectal plates absent; mesopraesternum complete; meso and metanota sculptured indistinctly, without major setae; foretarsi without a tooth in females, armed with stout tooth in males; forewings constricted medially, or sometimes nearly parallel-sided, without duplicated cilia.

Pelta weakly developed and hat or bell-shaped. Abdominal sternite VIII of male with transverse, glandular area. Tube usually straight-sided and shorter than head. Anal setae shorter than tube.

Members of this genus are usually small to medium-sized fungal feeding thrips with yellow or brown bodies which inhabit leaf litter, dead leaves and grass tussocks (Okajima, 1983b). *Psalidothrips* includes 17 species (Haga, 1973; Okajima, 1983b; Zur Strassen, 1972) of which a single species, *P. longiceps*, is known from the Philippines.

***Psalidothrips longiceps* Okajima**
Psalidothrips longiceps Okajima, 1983b: 7-8.
Holotype female, Philippines: Mindanao: Agko, Mt. Apo (**Okajima**) [not examined].

Diagnosis. Body ellowish brown to dark brown, with red hypodermal pigment in ocellar area. Body setae pale. Head longer than wide, with weak transverse reticulation posteriorly. Postocular setae about as long as eyes, with pointed or blunt apices. Antennal segment III brownish yellow; VIII about as long as VII. Pronotal major setae developed, with pointed or blunt apices. Femora brownish yellow; tibiae and tarsi yellow. Forewings light brown. Pelta nearly bell-shaped. Tube yellowish brown, much shorter than head.

Members of this species are easily distinguished from the remaining members of the genus by their longer heads (Okajima, 1983b). *P. longiceps* is known only from the Philippines.

Female macroptera. Head dark brown, about 1.2 times as long as wide; weakly reticulate posteriorly. Postocellar setae developed. Eyes about 0.35 times as long as head. Postocular setae about as long as dorsal length of eyes, with pointed or blunt apices. Cheeks rounded, incut behind eyes. Antennal segments I, VII and VII brown to dark brown; II brown with pale apices; III brownish yellow; IV to VI yellowish brown; VIII about as long as segment VII, or slightly longer; segment III and IV with 1 inner and 1 outer sense cones respectively. Mouthcone rounded.

Pronotum brown; posteroangular setae slightly longer than epimerals, with blunt or poined apices. Femora brownish yellow; tibiae and tarsi yellow; foretarsi without tooth. Forewings pale brown; subbasal wing setae reduced.

Pelta nearly bell-shaped, weakly reticulate, with pair of campaniform sensilla. Abdominal tergites I to VII pale medially, darkened laterally. Tergites VIII to IX dark brown. B1 setae of tergite IX shorter than tube; B2 setae about as long as tube or slightly longer. Tube yellowish brown; much shorter than head; nearly 2 times as long as basal width. Anal setae dark, longer than tube.

Male macroptera. Similar to female in general structure. Body color paler. Head shorter. Foretarsi each with tooth. Abdominal sternite VIII with well developed glandular area.

Material examined. Paratypes female, male, PHILIPPINES: Mindanao: Mt. Apo, on grass, 2-VIII-1979, S. Okajima (**TMNH**); 1 male, Mt. Pangasugan, Baybay, Leyte, in leaf litter, 29-V-1983, R. S. Raros (**CPRC**); **Paratypes** female, male, same data as those at TMNH (**SMFG**).

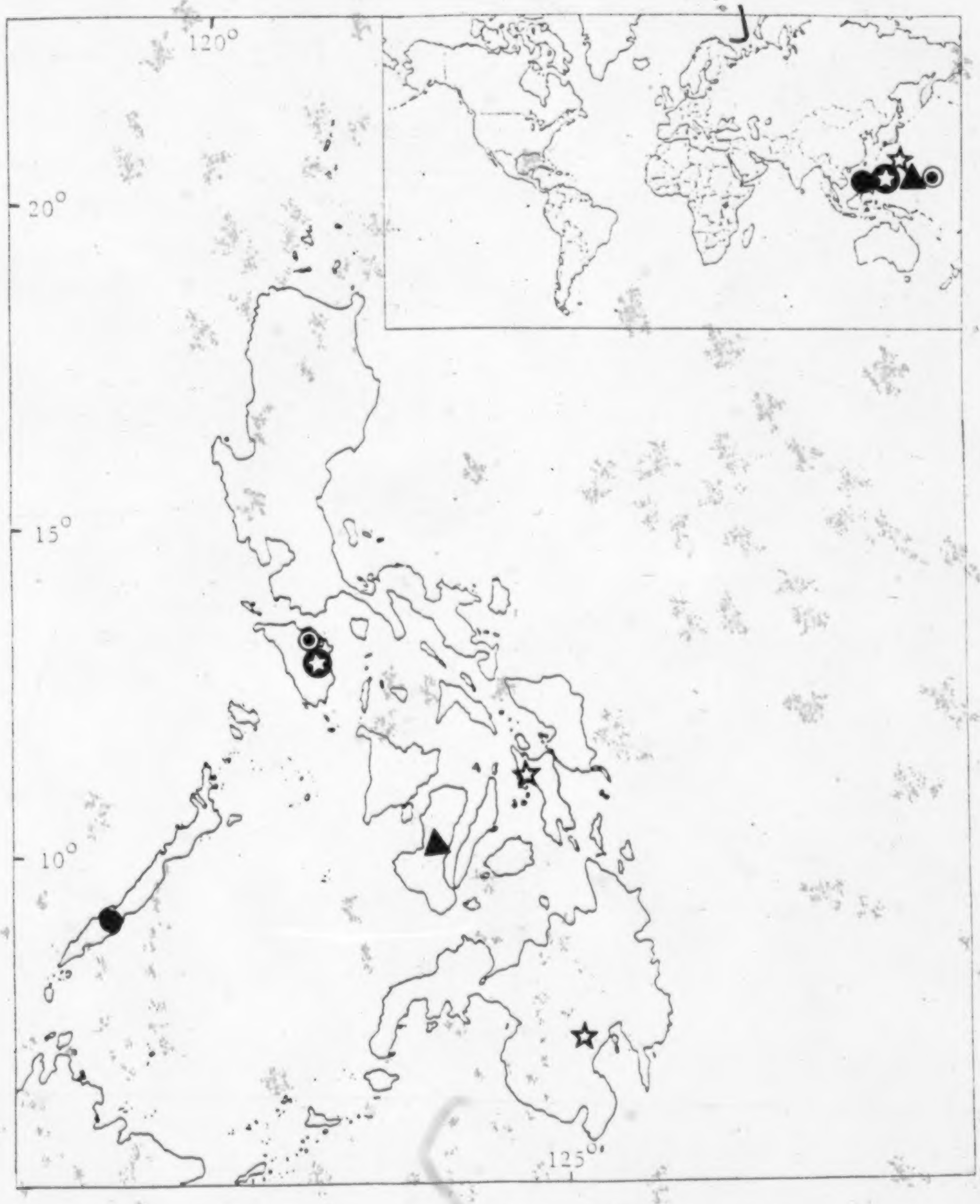
Distribution (Fig. 108). The known range of this species is confined to the Philippine Archipelago, where it is known from the islands of Visayas and Mindanao.

PHILIPPINES. Visayas: Mt. Pangasugan; Mindanao: Mt. Apo.

Hosts. grass, in leaf litter

Fig. 108. Distribution of *Praeciputhrips balli*, n. sp., *Praepodothrips causiapeltus*, n. sp., *Proaliothrips moundi*, n. sp., *Prosolomonthrips mindori*, and *Psalidothrips longiceps* Okajima in the Philippines.

✪ *Praeciputhrips balli*, n. sp.
● *Praepodothrips causiapeltus*, n. sp.
▲ *Proaliothrips moundi*, n. sp.
◉ *Prosolomonthrips mindori*, n. sp.
☆ *Psalidothrips longiceps* Okajima


120°
20°
15°
10°
125°

Genus *Psephenothrips* n. gen.
Type species: *Psephenothrips strasseni* n. sp.

Diagnosis. Head longer than wide, widest behind eyes and constricted at base. Ocelli large. Eyes about one third of head length. Postocular setae longer than eyes, with knobbed apices. Cheek setae slender. Antennae 8-segmented; segment III with 1 outer sense cone; segment IV with 1 inner and 2 outer sense cones; VII parallel-sided on apical three quarters; VIII elongate and constricted at base. Maxillary stylets retracted into head, retracted to level of eyes, closed together in middle of head. Mouthcone elongate, narrowly rounded.

Pronotal major setae developed, with knobbed apices; posteroangular setae longer than epimerals; epimeral sutures complete. Praepectal plates absent; probasisternum divided; mesopraesternum boat-shaped. Forefemora enlarged in females, unknown in males. Forewings parallel-sided, with duplicated cilia.

Pelta broadly bell-shaped, reticulate, with pair of campaniform sensilla. Abdominal tergites II - VII each with 2 pairs of wing retaining setae; tergite IX with B1 setae longer than tube. Tube shorter than head. Sternite VIII without glandular areas in males.

Adults of *Psephenothrips* n. gen. resemble those of *Praeciputhrips* n. gen in having maxillary stylets lying close together in the middle of the head and postocular setae well developed. Members of this genus differ from the latter in the shape of the head, mouthcone and pelta; longer antennal segments and sense cones; smaller body; well developed pronotal major setae and body color. *Psephenothrips*, n. gen. are related to *Liothrips* Uzel and related genera by having 1 sense cone on antennal segment III and 3 on segment IV.

Etymology. Psepheno is from the Greek word meaning dark (*Psephenothrips* = dark thrips).

***Psephenothips strasseni*, n. sp.**
Holotype female, Philippines: Visayas: Mt. Pangasugan, Baybay, Leyte (UPLB)
Figure 109a, b, c, d

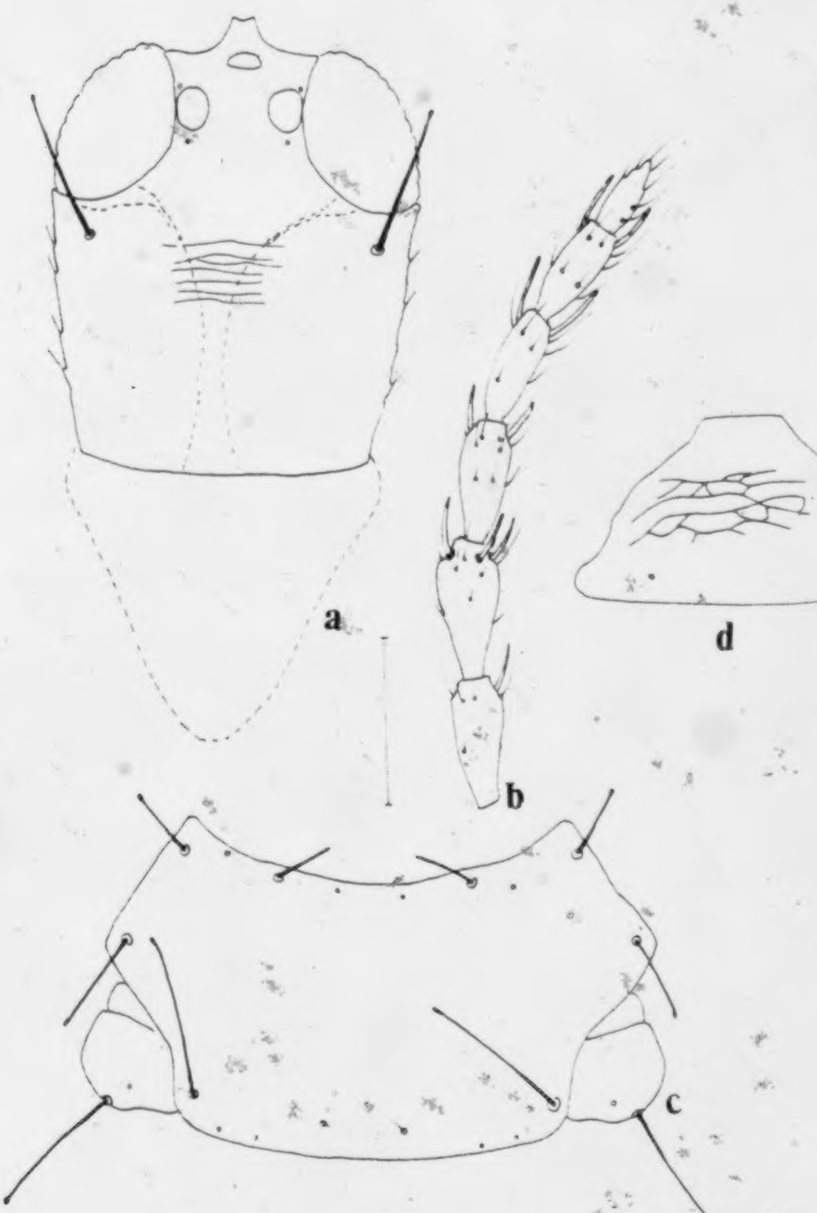
Diagnosis. Dark brown species. Body setae shaded with brown. Head gradually narrowed towards base. Eyes about one third of head length. Postocular setae longer than eyes, with knobbed apices. Cheek setae slender. Antennal segments III with 1 outer sense cone; IV with 1 inner and 2 outer sense cones; VII parallel-sided in apical three quarters; VIII elongate, constricted at base. Major setae of pronotum developed, with knobbed apices. Legs bicolored. Forewings pale, with duplicated cilia. Pelta broadly triangular. Posterior pair of wing retaining setae on tergites III to VI long, hook-shaped. Tube shorter than head.

Adults of this species resembles those of *P. balli*, n. sp. in having maxillary stylets reaching the eyes and postocular setae well developed. This species differ from the latter in the following characteristics: shape of head, mouthcone and pelta; more elongate antennal segments and sense cones, well developed pronotal major setae, and body size and color.

Female macroptera. Head longer than wide, gradually narrowed towards base; transversely striate (Fig. 109a). Eyes about one-third of head length. Postocular setae longer than dorsal length of eyes, with knobbed apices. Cheek setae slender, pale. Antennae more than 2.0 times as long as head; segments I, II, VII and VIII brown; III brownish, with yellow base; IV to VI brown, with yellow base; VIII elongate, constricted at base; segment III with 1 outer sense cone; IV with 1 inner and 2 outer sense cones (Fig. 109b). Mouthcone narrowly rounded (Fig. 109a).

Pronotum nearly smooth; major setae well developed, knobbed apically; anteromarginal setae slightly longer than anteroangulars; posteroangular setae longer than epimerals (Fig. 109c). Legs brown except tarsi lighter; forefemora slightly enlarged; foretarsi without tooth; subapex of hindtibiae each with well developed seta in outer

Fig. 109. *Psephenothrips strasseni*, n. sp., female holotype. a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta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margin. Forewings pale, each with 19 or more duplicated cilia; subbasal wing setae well developed, with knobbed apices. Meso and metanota reticulate.

Pelta broadly triangular, reticulate; pair of campaniform sensilla present (Fig. 109d). Abdominal tergites II to VII each with 2 pairs of wing retaining setae; posterior pair on tergites III to VI longer, hook-shaped; tergal lateral setae dark, well developed, with knobbed apices. B1 setae of tergite IX longer than tube, with blunt apices. Tube conical, pale at apex, shorter than head.

Dimensions (holotype female; um). Body length (extended) 2937.6. Head length 272, median width 244.8, dorsal eye length 88.4; postocular setae length 98.6; antennal segments length: I 37.4, II 64.6, III 76.5, IV 83.3, V 71.4, VI 69.7, VII 62.9, VIII 51. Pronotum length 187, median width 319.6, major setae length: aa 57.8, am 59.5, ml 71.4, pa 129.2, ep 108.8. Tergite IX setae length: B1 221, B2 37.4 B3 193.8. Tube length 224.4.

Type data. **Holotype** female, PHILIPPINES: Visayas: Mt. Pangasugan, Baybay, Leyte, on "camiring", 6-V-1983, C. P. Reyes (**UPLB**). **Paratype** (1 female) same data as holotype (**UPLB**).

Male. Unknown.

Material examined. Type series only (**UPLB**).

Etymology. This species is named after Dr. Richard zur Strassen, a thysanopteran systematist par excellence, for his guidance, encouragement and considerable assistance.

Distribution (Fig. 111). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Mt. Pangasugan, Leyte.

Host. "Camiring"

Genus *Rosingothrips* n. gen

Type species: *Rosingothrips ommatus* n. sp..

Diagnosis. Head longer than wide, constricted at base; reticulate. Eyes slightly prolonged ventrally, posterior ommatidia enlarged; postocular setae developed, with blunt apices. Cheeks setae spine-like; antennae 8-segmented; segment III with 1 outer sense cone; segment IV with 4 sense cones; maxillary stylets retracted into head and almost touched medially; maxillary bridge absent. Mouthcone elongate.

Pronotum weakly reticulate, with major setae with blunt apices; posteroangular setae longer than epimerals; epimeral sutures complete. Praepectal plates absent; probasisternum separated; mesopraesternum boat-shaped. Foretarsi without tooth. Forewings parallel-sided, base and apex narrow, and with duplicated cilia.

Pelta triangular, reticulate, without campaniform sensilla. Abdominal tergites II - VII each with 2 pairs of wing retaining setae. Tergite IX with B1 setae longer than tube. Tube slightly shorter than head. Sternite VIII without glandular areas in males.

Adults of *Rosingothrips* n. gen. are similar to those of *Amphidoxothrips*, n. gen. and *Mesothrips* Zimmermann in having spines on the cheeks and a constricted base to the head. Members of this genus differ from both in not having a maxillary bridge; in having eyes with enlarged posterior ommatidia and prolonged on ventral surface of head; foretarsi without a triangular tooth in both sexes; and forewings parallel sided and with narrow base and apex.

Etymology. This genus is named after my greatest teacher and late mother Rosalina (Rosing).

***Rosingothrips ommatus*, n. sp.**
Holotype female, Philippines: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro (UPLB)
Figure 110a, b, c, d

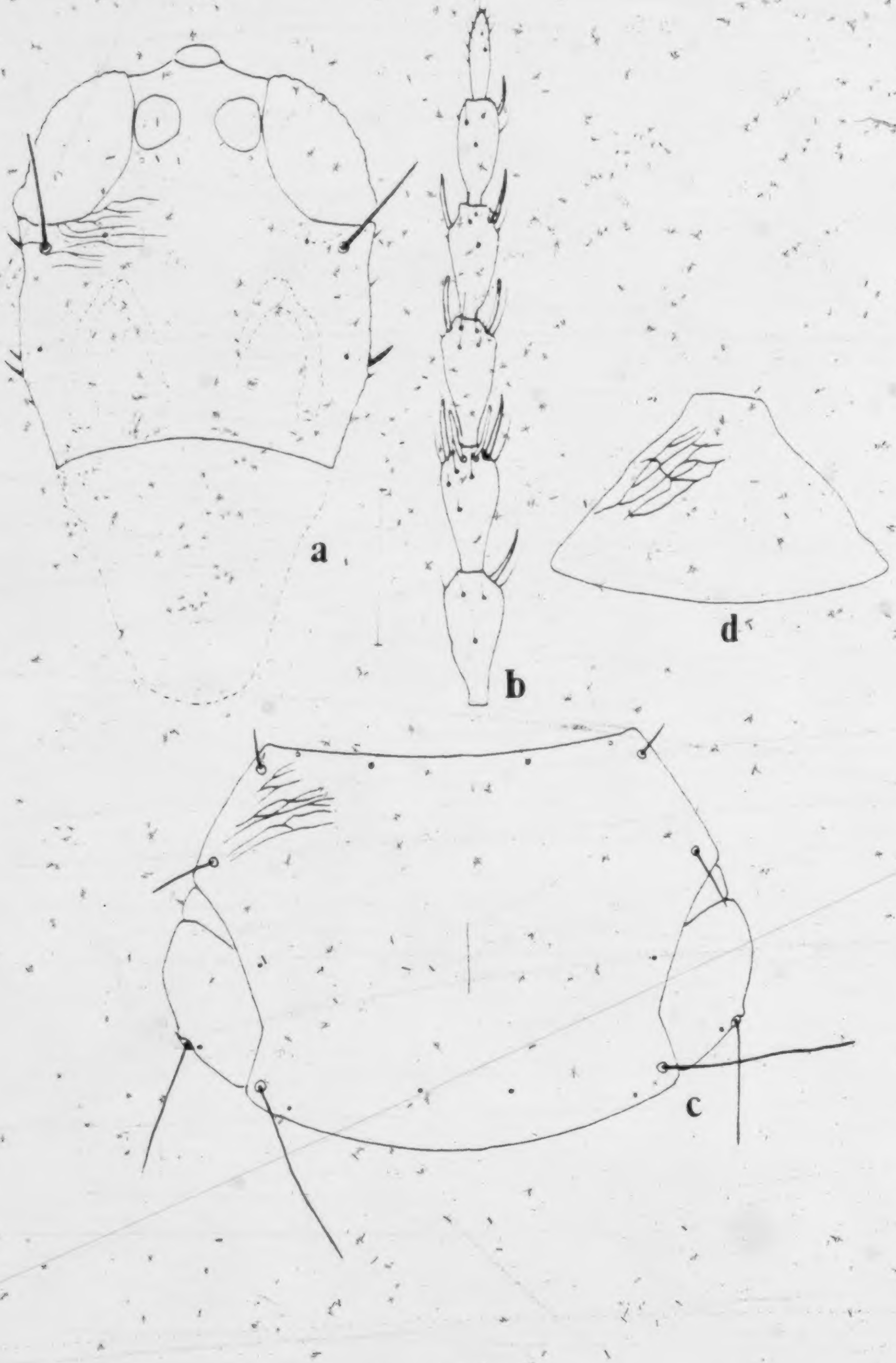
Diagnosis. Body brown. Body setae pale. Head constricted at base. Eyes prolonged ventrally and with enlarged posterior ommatidia. Postocular developed, with blunt apices, shorter than dorsal length of eyes. Cheeks with dark spines. Antennal segments III and IV with 1 and 4 sense cones respectively. Major pronotal setae with blunt apices; anteromarginal setae vestigial. Legs predominantly brown; foretarsi without tooth. Forewings broad, with narrow base and apex and with duplicated cilia. Pelta triangular. Tube slightly shorter than head.

In addition to the characters mentioned in the generic description, adults of this species differ from those of *Amphidoxothrips armatus*, n. sp., in having 4 rather than 3 sense cones on antennal segment IV; campaniform sensilla in pelta absent; and antennal segment VIII elongate and constricted at base.

Female macroptera. Head longer than wide, constricted at base; transversely striate (Fig. 110a). Eyes prolonged ventrally, with enlarged posterior ommatidia. Postocular setae long, slender, blunt apically, shorter than dorsal length of eyes. Cheek setae dark, spine-like. Antennae more than 2.0 times as long as head; segments I, VII and VIII brown; III yellowish brown, with darker apex; IV to VI brown, with yellow bases; II brown, with pale apex; segments III and IV with 1 and 4 sense cones respectively; VIII elongate, constricted at base (Fig. 110b). Mouthcone rounded (Fig. 110a).

Pronotum slightly reticulate; major setae with blunt apices; anteromarginal setae vestigial; midlateral setae longer than anteroangulars; posteroangular setae longer than epimerals (Figs. 110c). Legs predominantly brown; apices of tibiae and tarsi pale; forefemora enlarged; foretarsi without tooth. Forewings broad, narrow at base and apex; 18 to 20 duplicated cilia; subbasal wing setae developed, with blunt apices. Meso and metanotum reticulate.

Fig. 110. *Rosingothrips ommatus*, n. sp., female holotype: a. Head b. Right antennal segments III to VIII c. Pronotum d. Pelta


a
b
d
c

Pelta broadly triangular; reticulate; pair of campaniform sensilla absent (Fig. 110d). Abdominal tergites II to VII each with 2 pairs of slightly curved wing retaining setae; tergal lateral setae slender, pale, with blunt apices. B1 setae of tergite IX longer than tube, with pointed apices. Tube conical, a little shorter than head; dark brown, pale apically. Anal setae shorter than tube.

Dimensions (holotype female; um). Body length (extended) 2822. Head length 255, median width 231.2, dorsal eye length 91.8, postocular setae length 88.4; antennal segments length: I 42.5; II 59.5; III 81.6; IV 78.2; V 76.5; VI 68; VII 66.3; VIII 61.2. Pronotum length 251.6, median width 336.6, major setae length: aa 40.8, ml 68, pa 146.2, ep 100.3. Tergite IX setae length: B1 217.6; B2 39.1; B3 192.1. Tube length 244.8.

Type data. **Holotype** female, PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro, on leaves of unknown vine, 20-VI-1987, C. P. Reyes (**UPLB**). **Paratypes** (4 females, 2 males) same data as holotype (**UPLB**).

Male macroptera. Similar to female in general structure and color but smaller. Pronotal major setae shorter.

Dimensions (allotype male; um). Body length (extended) 1904. Head length 207.4, median width 217.6, dorsal eye length 85, postocular setae length 64.6; antennal segments length: I 54.4; II 57.8; III 74.8; IV 71.4; V 71.4; VI 61.2; VII 57.8; VIII 51. Pronotum length 217.6, median width 336.6, major setae length: aa 32.3, ml 34, pa 119, ep 83.3. Tergite IX setae length: B1 217.6; B2 34; B3 57.8. Tube length 183.6.

Material examined. Type series only (**UPLB**).

Etymology. Ommatus is from a Greek word omma meaning "eye".

Distribution (Fig. 111). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Visayas. PHILIPPINES: Visayas: Sipit Saburan, Puerto Gallera, Oriental Mindoro.

Host. leaves of unknown vine

Genus *Stephanothrips* Trybom

Stephanothrips Trybom, 1913: 42.
Type-species: *Stephanothrips buffai* Trybom, by monotypy.

Diagnosis. Head about 1.2 times as long as wide, tuberculate. Vertex with 1, 2 or 3 pairs of prominent setae. Eyes small ,with 3 to 6 large facets in line dorsally. Antennae 4- to 6-segmented; morphological segments III, IV, and V fused; VI, VII, and VIII separated in part or entirely fused; segments III and IV with 1 inner and 1 outer sense cones respectively. Maxillary stylets retracted far into head, almost touched in middle of head. Mouthcone short, broadly rounded.

Pronotal epimeral setae developed; epimeral sutures incomplete. Praepectal plates present, reduced; mesopraesternum regenerate; meso- and metasterna fused. Hind coxae farther apart than midcoxae. Wings absent.

Abdominal tergite I completely sclerotized without differentiated pelta, seemed fused with segment II dorsally in few taxa. Tergites without wing retaining setae. Tergite IX much longer than wide. Tube long, wider at apex. Anal setae usually longer than tube, 6 pairs.

Adults of *Stephanothrips* are small, bicolored, thrips occurring in leaf litter, on dead branches or leaves and at the base of grasses (Mound and Houston, 1987). Fifteen species are included in this genus (Mound and Houston, 1987; Okajima, 1976, 1989). Of which 2 species are known from the Philippines.

Key to Philippine species of *Stephanothrips* Trybom

1 Foretarsi each with hamus; vertex of head with 3 pairs of setae; head and pronotum dark brown........................ *S. occidentalis* Hood and Williams

1' Foretarsi without hamus; vertex of head with 1 pair of setae; head and pronotum yellowish white .... *S. leucocephalus* Okajima

Stephanothrips leucocephalus Okajima
Stephanothrips leucocephalus Okajima, 1982: 54-55.
Holotype female, Philippines: Mindanao: Agko, Mt. Apo (**Okajima**)[not examined]

Diagnosis. Body bicolored dark brown and yellowish white, with some red hypodermal pigment. Head shaded with brown anteriorly; abdominal tergites shaded with brown laterally. Vertex of head with single pair of setae, with blunt apices each on tubercle. Ocelli and wings absent. Antennal morphological segments I to V yellow; VI to VIII brown. Forelegs yellowish white; midlegs dark brown; foretarsi without hamus. Tube longer than head. This species is known only from the Philippines.

Female aptera. Head yellowish white, shaded with brown anteriorly; tuberculate; distinctly longer than wide, widest near base. Vertex produced and rounded in front of eyes, with a pair of setae with blunt apices, each on tubercle. Ocelli absent. Eyes small, with 5 to 6 ommatidia dorsally. Antennae longer than head; 6- segmented (morphological segments III to V completely fused); morphological segments VII and VIII broadly joined; segments I to V yellow; VI to VIII brown; IV and V each with 1 inner and 1 outer sense cones respectively. Mouthcone rounded.

Pronotum about 1.5 times as wide as long; yellowish white; nearly rectangular, without tubercles. Epimeral setae reduced. Praepectal plates slightly developed. Legs short and stout; forelegs yellowish white; midlegs dark brown; hindtibiae pale basally; foretarsi without hamus. Wings absent. Meso and metanota dark brown; strongly reticulate.

Abdominal tergites yellowish white, brown laterally. Tergite I strongly tuberculate. Tube 1.4 times as long as head; 9.3 times as long as apical width; slightly rounded apically. Anal setae yellowish; about 3 times as long as tube.

Male aptera. Similar to female in general color and structure . A pair of very short setae on vertex .

Material examined. I was not able to borrow Okajima's specimens.

Distribution (Fig. 111). The known range of this species is confined to the Philippine Archipelago, where it is known from the island of Mindanao. PHILIPPINES: Mindanao: Agko, Mt. Apo; Ilomavis, [Kidapawan], North Cotabato.

Hosts. dead leaves and branches, dead fern.

Stephanothrips occidentalis **Hood and Williams**
Stephanothrips occidentalis Hood and Williams, 1925: 48-69.
Holotype female, St. Croix (? **USNM**)
Stephanothrips occidentalis Hood and Williams; Kudo, 1978: 171.

Diagnosis. Body bicolored greyish yellow to dark brown. Head and pronotum dark brown, abdominal tergites brown laterally, with dark, median longitudinal stripe. Vertex of head with 3 pairs of developed setae with slightly expanded apices. Antennal morphological segments I, VI to VIII dark brown; segments II to V yellow. Epimeral setae of pronotum less than 15um long. Forefemora dark brown, with yellow bases and apices; foretarsi each with hamus on outer margin. Abdominal tergites brown laterally, with dark, median, longitudinal stripe. Tube yellow with brown apex.

Female aptera. Head dark brown, tuberculate; longer than wide, widest at base. Vertex with 3 pairs of long setae, slightly expanded apically; inner pair longest; outer pair inserted posteriorly and closer to each other. Antennae 6-segmented (morphological segments III to V fused); morphological segments I, VI to VIII dark brown; II to V yellow; segments III and IV with 1 inner and 1 outer sense cones respectively. Mouthcone rounded.

Pronotum dark brown, wider than long; epimeral setae less than 15 um long. Legs short and stout; forefemora dark brown, with yellow apices; foretarsi with hamus on outer margin; tibiae yellow basally and apically, brown medially; all tarsi yellow. Wings absent. Meso and metanota, yellow with brown lateral margins; wider than pronotum. Mesopraesternum narrow.

Abdominal tergites brown laterally, with median dark longitudinal stripe. Tergite I with median tubercles. Tergite IX about as long as head; about 1.7 times as long as wide. Tube about 1.5 times as long as head; yellow with brown apex.

Male aptera. Similar to female in general color and structure. Not yet known in the Philippines.

Material examined. 1 female, Philippines: Visayas: Mt. Pangasugan, Leyte, in litter, 11- II-1983, A. Almeroda (**CPRC**).

Distribution (Fig. 111). The known range of this species extends from Sierra Leone eastward in India to Indo-Australia Archipelago, in New Zealand to Pacific and Caribbean Islands. In the Philippine Archipelago, this species is known from the three principal zoogeographic regions, on the islands of Luzon, Visayas and Mindanao. PHILIPPINES: Luzon: San Pablo City; Pagsanjan, Laguna; Visayas: Mt. Pangasugan, Leyte; Mindanao: Agko, Mt. Apo; Ilomavis, [Kidapawan], North Cotabato. INDONESIA. MALAYSIA: Penang, Kuala Lumpur. THAILAND. INDIA. TAIWAN. HONGKONG. JAPAN. AUSTRALIA: Queensland. NEW ZEALAND. U.S.A.: Hawaii; Florida. ST. CROIX. TRINIDAD. SIERRA LEONE.

Hosts. dead fern, dead leaves and grass, dead branches, dry vine and twigs, in litter, dead *Phoenix* sp., dead leaves, grass tussock, *Cinnamomum camphora*, bamboo, fallen leaves, dead branches taken by beating in forest.

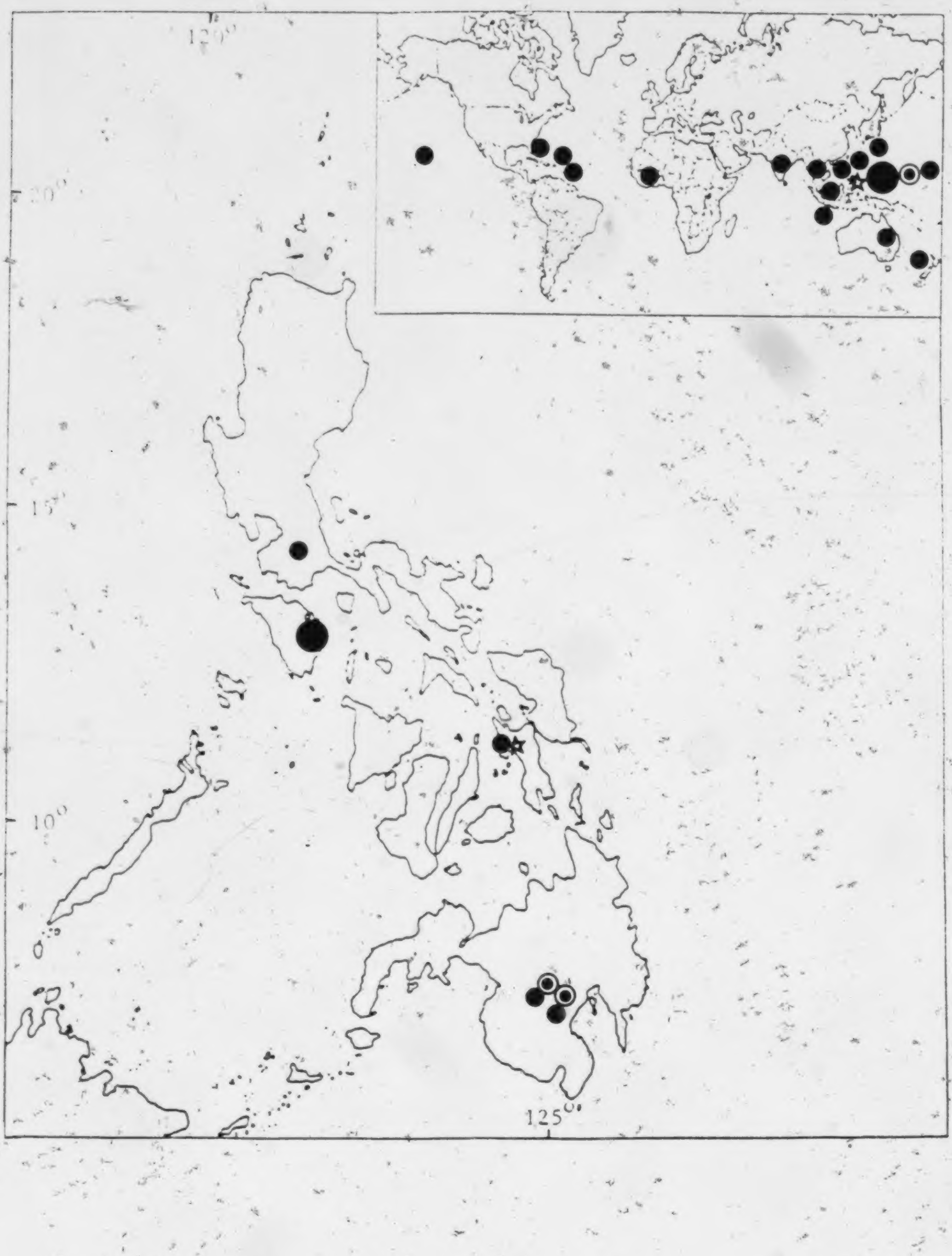
Fig. 111. Distribution of *Psephenothrips strasseni*, n. sp., *Rosingothrips ommatus*, n. sp. and *Stephanothrips* species

☆ *Psephenothrips strasseni*, n. sp.

● *Rosingothrips ommatus*, n. sp.

◉ *Stephanothrips leucocephalus* Okajima

● *Stephanothrips occidentalis* Hood and Williams


120°
20°
15°
10°
125°

5. ZOOGEOGRAPHIC ANALYSIS

In this section some continental and island countries of Asia, Southeast Asia, and Australia are analyzed in terms of their thrips faunas. This part of the world is an interesting area for zoogeographic investigation due to its diverse biota.

The Philippine archipelago is one among the clusters of islands between Asia and Australia (Fig. 112). The archipelago comprises 7,107 islands having a total land area of about 299,681 square kilometers. The Philippines are on the western edge of the Pacific Ocean between latitudes 5 and 21 N. Most islands are mountainous and their peaks and ranges profoundly influence the seasonal distribution of rainfall which correspondingly affects the type of vegetation growing at low and medium altitudes (Merrill,1926). Its tropical climate is governed by the southwest and northeast monsoons or tradewinds and by the north equatorial and kuroshio currents of the Pacific and has three main seasons: a wet or typhoon June to October, a cool, dry November to February, and a hot, dry March to May.

The Republic of the Philippines is divided from north to south into three island groups: Luzon, Visayas, and Mindanao (Fig. 113). Visayas consists of clusters of small to medium-sized islands. Since the insect fauna of the Philippine archipelago has been enriched by movement of taxa between neighboring islands, I am interested to know if the Philippine island groups form a cluster in terms of their thrips fauna. To determine this, the thrips fauna of the Philippine island groups, India, Taiwan, Japan, Thailand, Indonesia, Malaysia, New Guinea and Australia were analyzed with the following objectives: to determine which island groups share their thrips fauna the most; to identify with which neighboring countries each of these groups has strongest affinity, and to compare patterns of affinity between Terebrantia and Tubulifera.

Fig. 112. Map of the Philippines and its neighboring countries.

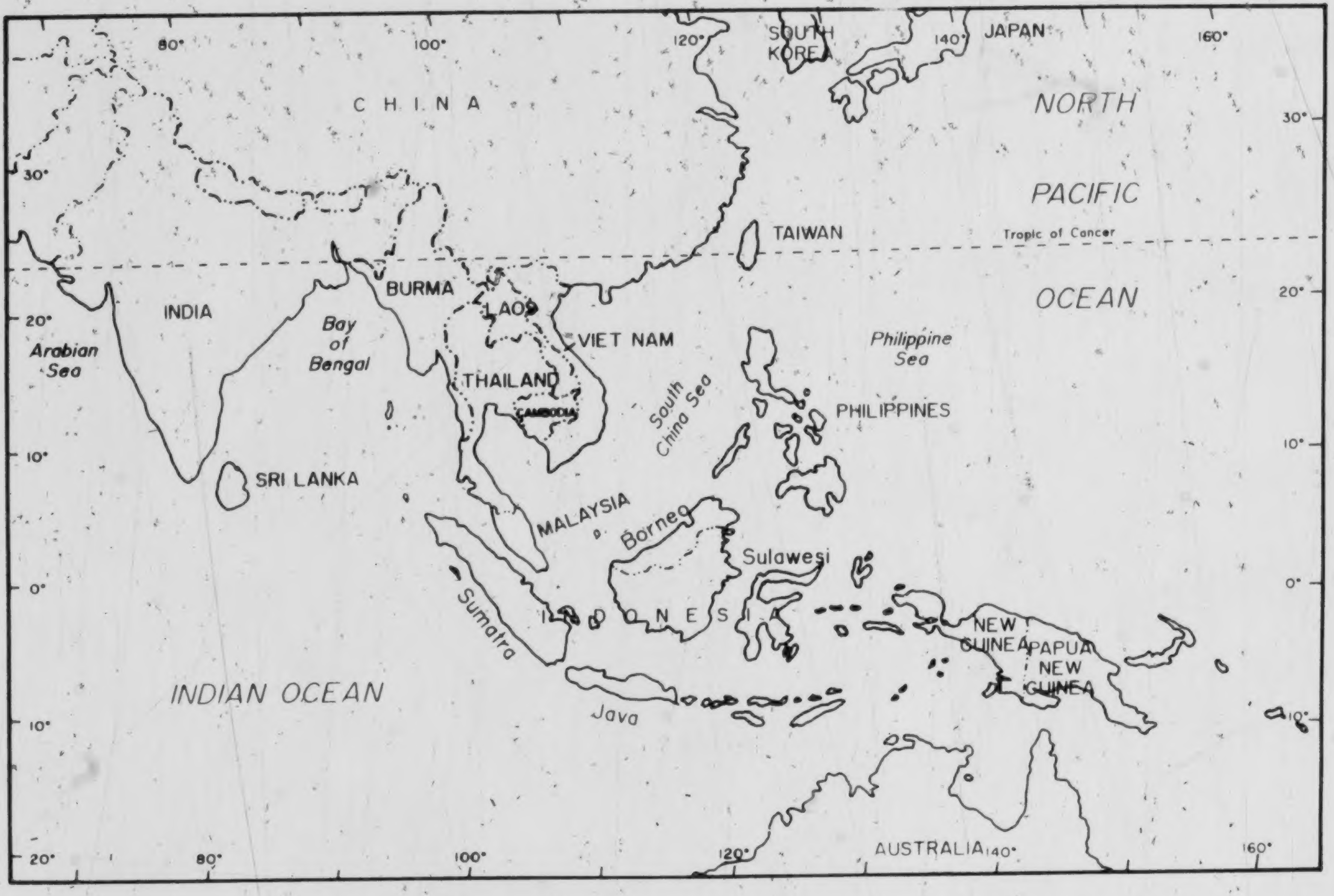
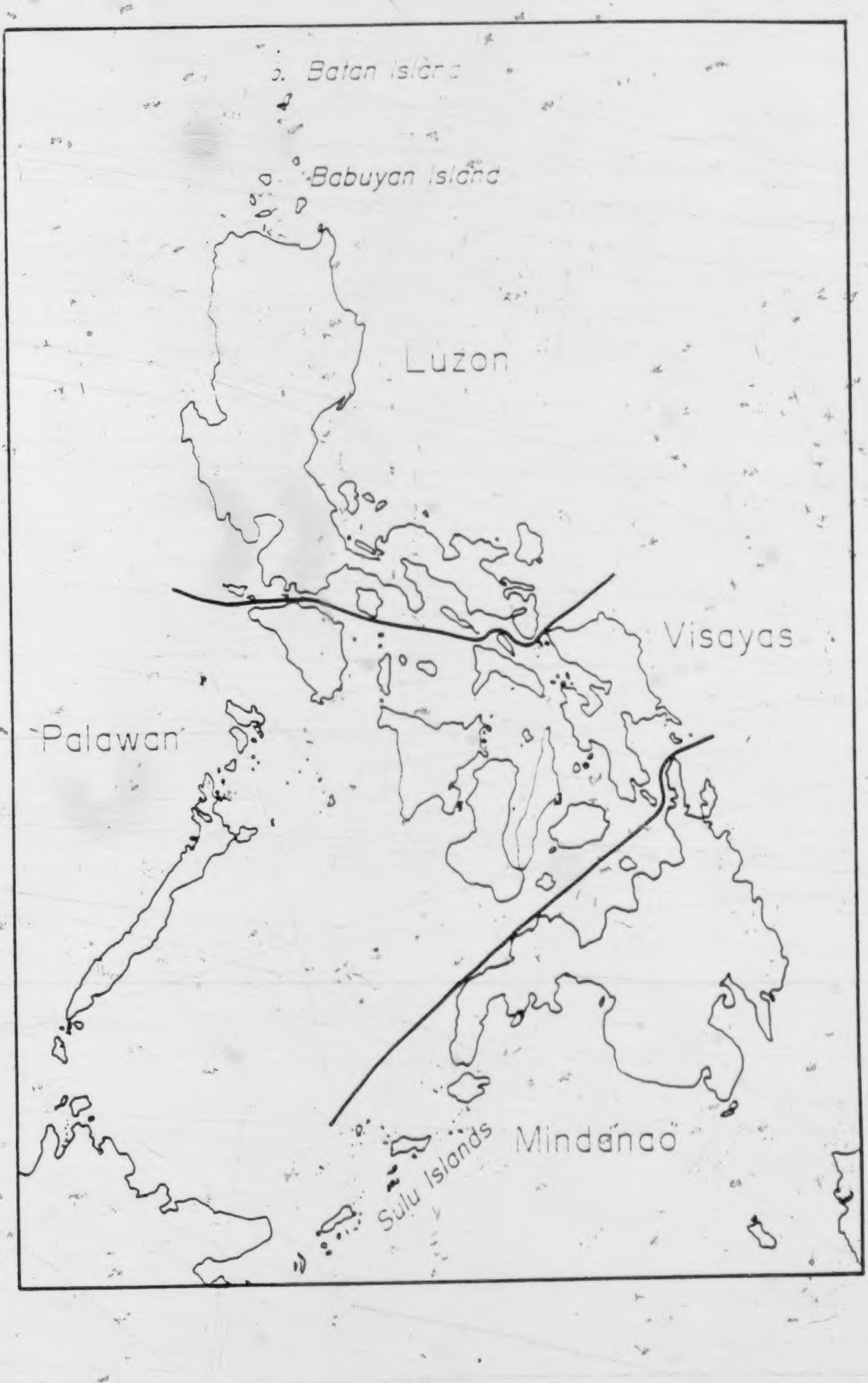

80°
100°
120°
140°
160°
30°
20°
10°
0°
10°
20°
CHINA
SOUTH KOREA
JAPAN
NORTH
PACIFIC
OCEAN
Tropic of Cancer
TAIWAN
BURMA
LAOS
VIET NAM
THAILAND
CAMBODIA
INDIA
Arabian Sea
Bay of Bengal
SRI LANKA
South China Sea
Philippine Sea
PHILIPPINES
MALAYSIA
Borneo
Sulawesi
INDONESIA
Sumatra
Java
NEW GUINEA
PAPUA NEW GUINEA
INDIAN OCEAN
AUSTRALIA

Fig. 113. Map of the Philippines showing 3 regions


Batan Island
Babuyan Island
Luzon
Visayas
Palawan
Sulu Islands
Mindanao

Methods

The known thrips faunas of the Philippines, India, Taiwan, Japan, Thailand, Indonesia, Malaysia, New Guinea, and Australia were analyzed. For this purpose, the Philippines were subdivided into 4 island groups: Luzon, Visayas, Palawan, and Mindanao (Fig. 114). Palawan is treated independent of Visayas, despite the fact that the island is undercollected especially for tubuliferan species, since previous studies of various workers on its biota have indicated its clear affinity with Borneo (Malaysia). Palawan has the lowest population density among major Philippine islands and is essentially a pioneer area (Vreelanf, Hurwitz, Just, Moeller and Shinn, 1976). The remoteness of the island and the fear of contracting malaria from that area have been the main limitations to collection. As for other countries noted above, it would be ideal to treat each large island separately but since not all are well collected, this is not possible at present. Data used in this analysis were gathered from various sources. The number of genera assigned to the Philippines was primarily based on my collections and from the works of Okajima and the few other workers who have contributed to our present knowledge of the group (Table 1). Mound and Houston's (1987) checklist for Australia was used as a basis for that area while the Catalogue of Miyazaki and Kudo (1988) was used for Japan. For India, the numerous works of Ananthakrishnan and Bhatti were used. Zoological Record, the Catalogue of the Thysanoptera of the World (Jacot-Guillarmod, 1971, 1974, 1975, 1978, 1979 ; Jacot-Guillarmod and Brothers, 1986), and zur Strassen's personal files were the main references for other countries included in this analysis.

To measure the faunal similarity between 9 countries, Jaccard's Coefficient was used. This is the most widely used measure in both taxonomic and bioassociational studies and was introduced by Jaccard in 1908 as the Coefficient of Community. See Cheetham and Hazel (1969) for details. Terebrantia and Tubulifera were analyzed separately at the generic level in hopes of revealing fundamental relationships since preliminary analysis at the

Fig. 114. Map of the Philippines divided into 4 geographic regions.

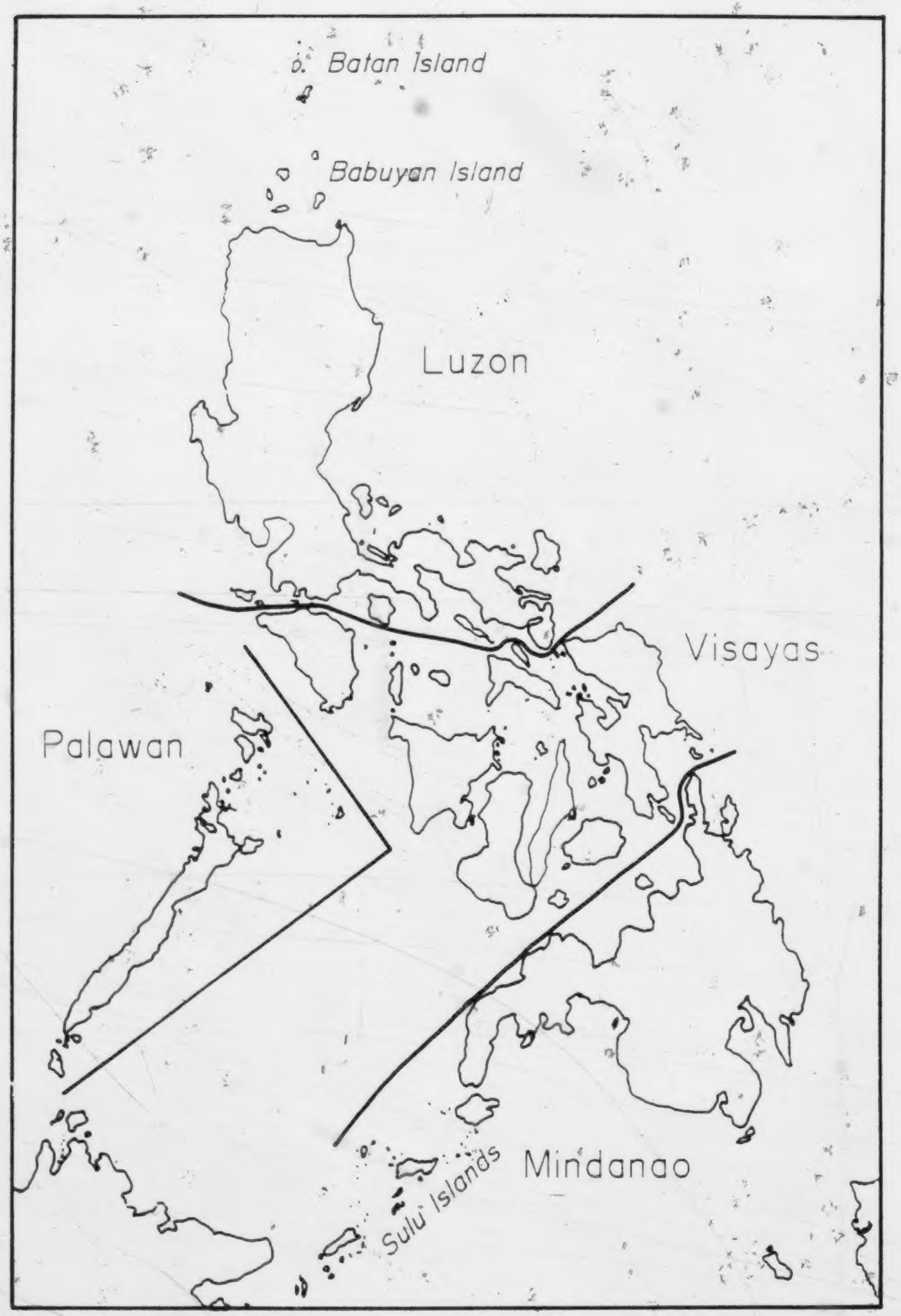

Batan Island
Babuyan Island
Luzon
Visayas
Palawan
Mindanao
Sulu Islands

Table 1. Number of known genera of Thysanoptera from 9 countries (as of May, 1989).

COUNTRIES	TEREBRANTIA	TUBULIFERA	TOTAL	AREA (sq. kms.)
PHILIPPINES				
Luzon	31	33	64	104, 688
Palawan	8	10	18	11, 700
Visayas	30	27	57	75, 580
Mindanao	25	25	50	98, 791
INDIA	135	131	266	3, 287, 588
TAIWAN	45	38	83	36, 185
JAPAN	48	54	102	377, 441
THAILAND	18	28	46	513, 998
MALAYSIA	20	44	64	332, 318
INDONESIA	47	74	121	2, 042, 034
P. NEW GUINEA	22	29	51	475, 369
AUSTRALIA	51	90	141	7, 682, 300

species level failed to yield meaningful patterns (Table 2). Various factors might have influenced these results ; for example, the semi-isolated island situation might have provided conditions ideal for rapid speciation.

Results and Discussion

Computed values obtained based on shared genera of Terebrantia and Tubulifera in nine countries are shown in Table 3 while results of cluster analysis (phenogram) for both suborders are shown in Fig. 115.

For Terebrantia (Fig. 115A), Australia has more genera in common with all countries analyzed than does India. The three island groups of the Philippines: Luzon, Mindanao, and Visayas together form a tight cluster having stronger affinity with Taiwan and Japan than with Palawan. Indonesia has a closer affinity with Visayas, Mindanao, and Luzon than with Malaysia. Malaysia and Palawan form a cluster and together share many genera with New Guinea. New Guinea has a closer affinity with Southeast Asian countries than with Australia. Thailand seems to be faunistically remote from other Asian countries which is probably a manifestation of inadequate collecting.

For tubuliferan genera (Fig. 115B), Palawan is faunistically remote from all other areas analyzed. This result is expected since, as mentioned earlier, the tubuliferans of this island are known inadequately and the number of genera used in this analysis probably not sufficient to show any meaningful alliances. Unlike those of Terebrantia, the tubuliferan genera of Australia are distinct from those of the rest of the countries studied. Visayas and Mindanao form a tight cluster and share more genera with Malaysia than Luzon. Thailand has a strong affinity with Taiwan while Luzon has a distinct fauna. As in Terebrantia, New Guinea has a closer affinity with Asian countries than with Australia and Indonesia is distinct from Luzon, Visayas, Mindanao, and Malaysia.

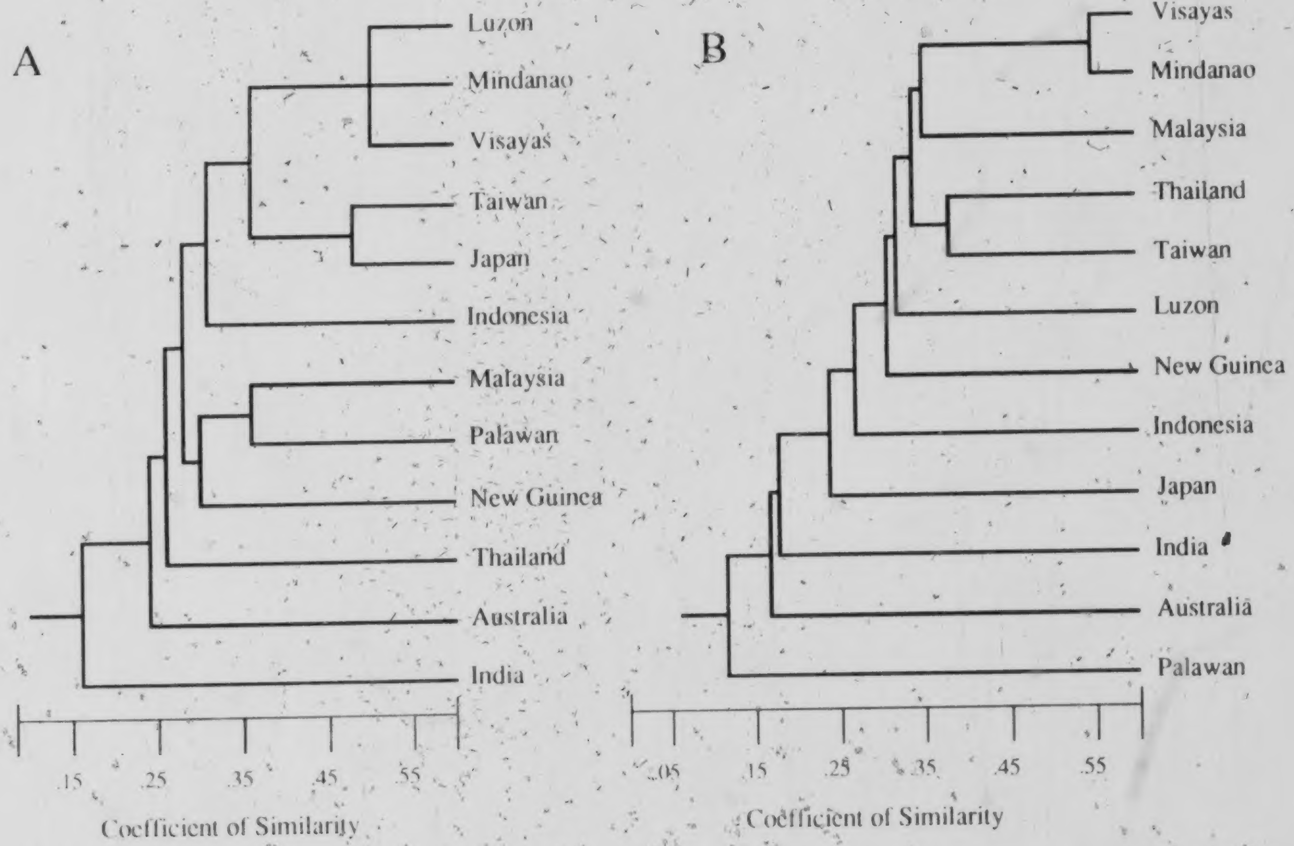
Table 2. Number of known species of Thysanoptera from 9 countries (as of May, 1989).

COUNTRIES	TEREBRANTIA	TUBULIFERA	TOTAL	AREA (sq. kms.)
PHILIPPINES	87	108	195	299, 681
INDIA	274	415	689	3,287,588
TAIWAN	91	102	193	36,185
JAPAN	102	107	209	377,441
THAILAND	31	49	80	513,998
MALAYSIA	31	98	129	332,318
INDONESIA	113	254	367	2,042,034
P. NEW GUINEA	40	47	87	475,369
AUSTRALIA	154	268	422	7,682,300

Table 3. Jaccard's indices (C/N1+N2-C) of known genera of Terebrantia and Tubulifera from 9 countries (as of May, 1989).

Terebrantia Tubulifera	Luzon	Visayas	Palawan	Mindanao	India	Taiwan	Japan	Thailand	Malaysia	Indonesia	New Guinea	Australia
Luzon		.48	.24	.50	.20	.46	.27	.40	.42	.30	.36	.30
Visayas	.47		.28	.50	.20	.38	.34	.36	.27	.34	.26	.26
Palawan	.14	.18		.38	.06	.22	.18	.16	.36	.21	.28	.13
Mindanao	.22	.55	.22		.14	.36	.32	.28	.30	.34	.28	.21
India	.19	.16	.06	.14		.26	.19	.13	.11	.21	.11	.16
Taiwan	.35	.35	.12	.31	.25		.48	.21	.38	.33	.26	.39
Japan	.23	.21	.05	.20	.14	.35		.18	.26	.23	.21	.28
Thailand	.31	.34	.12	.39	.15	.38	.18		.31	.20	.21	.16
Malaysia	.26	.34	.08	.36	.20	.36	.24	.31		.24	.31	.20
Indonesia	.25	.28	.09	.26	.22	.32	.24	.26	.26		.30	.24
New Guinea	.30	.33	.19	.38	.16	.36	.27	.21	.30	.25		.26
Australia	.14	.15	.05	.12	.15	.26	.17	.16	.18	.20	.20	

Fig. 115. Cluster analysis of faunal similarity indices (Jaccard's) for the different Philippine regions and for eight countries based on the genera of (A) Terebrantia and (B) Tubulifera.


A
Luzon
Mindanao
Visayas
Taiwan
Japan
Indonesia
Malaysia
Palawan
New Guinea
Thailand
Australia
India
.15
.25
.35
.45
.55
Coefficient of Similarity
B
Visayas
Mindanao
Malaysia
Thailand
Taiwan
Luzon
New Guinea
Indonesia
Japan
India
Australia
Palawan
.05
.15
.25
.35
.45
.55
Coefficient of Similarity

Due to inadequate information on the distribution of Indo-Australian thrips, it is hardly possible to draw precise conclusions as to the faunistic affinities of these areas from study of Thysanoptera alone. Four general trends, however, are shown that hold true for the thrips fauna of this region.

a) Visayas and Mindanao have the most genera in common among the four island groups of the Philippines

Knowledge of the geologic history of these islands might help explain this strong affinity between Visayas and Mindanao. During the late Pleistocene (Fig. 116), northern Mindanao was separated from the islands of Visayas (e.g. Dinagat, Leyte, etc.) by a channel less than 120m deep. The Visayan islands, likewise, were isolated from each other by various channels from less than 120m to 140m deep. Sea level during the late middle Pleistocene was 160-180m lower than it is at present (Donn, Farrand, and Ewing, 1962; Goscoyne, et. al. 1979) and land bridges may have connected Mindanao to Dinagat and to other Visayan islands; these might have served as highways for the migration or exchange of faunal elements between these islands. Evidence in support of this inference is coarse-grained sandstones or sediments of Vigo-Miocene age. The distribution of these sediments indicates that an elongate, Palawan-like island, extended from the eastern coast of Mindanao through central Leyte, the Camarines Peninsula, across the embayment on the eastern side of Polillo and northward on to the east side of northern Luzon (Fig. 117) (Dickerson, 1928). Why Luzon does not show a similar strong affinity to Visayas and Mindanao in spite of this connection could be due to the immigration of Asian faunal elements through Taiwan. The sedimentary record of Taiwan for early Vigo-Miocene time is similar to that of the Philippines which seems to suggest that Taiwan and the Philippines may have constituted single land mass. The Batan and Babuyan islands north of Luzon

Fig. 1.16. Map of the Philippines showing the extent of late Pleistocene Islands, based on the current 120m bathymetric line (Heaney, 1986).

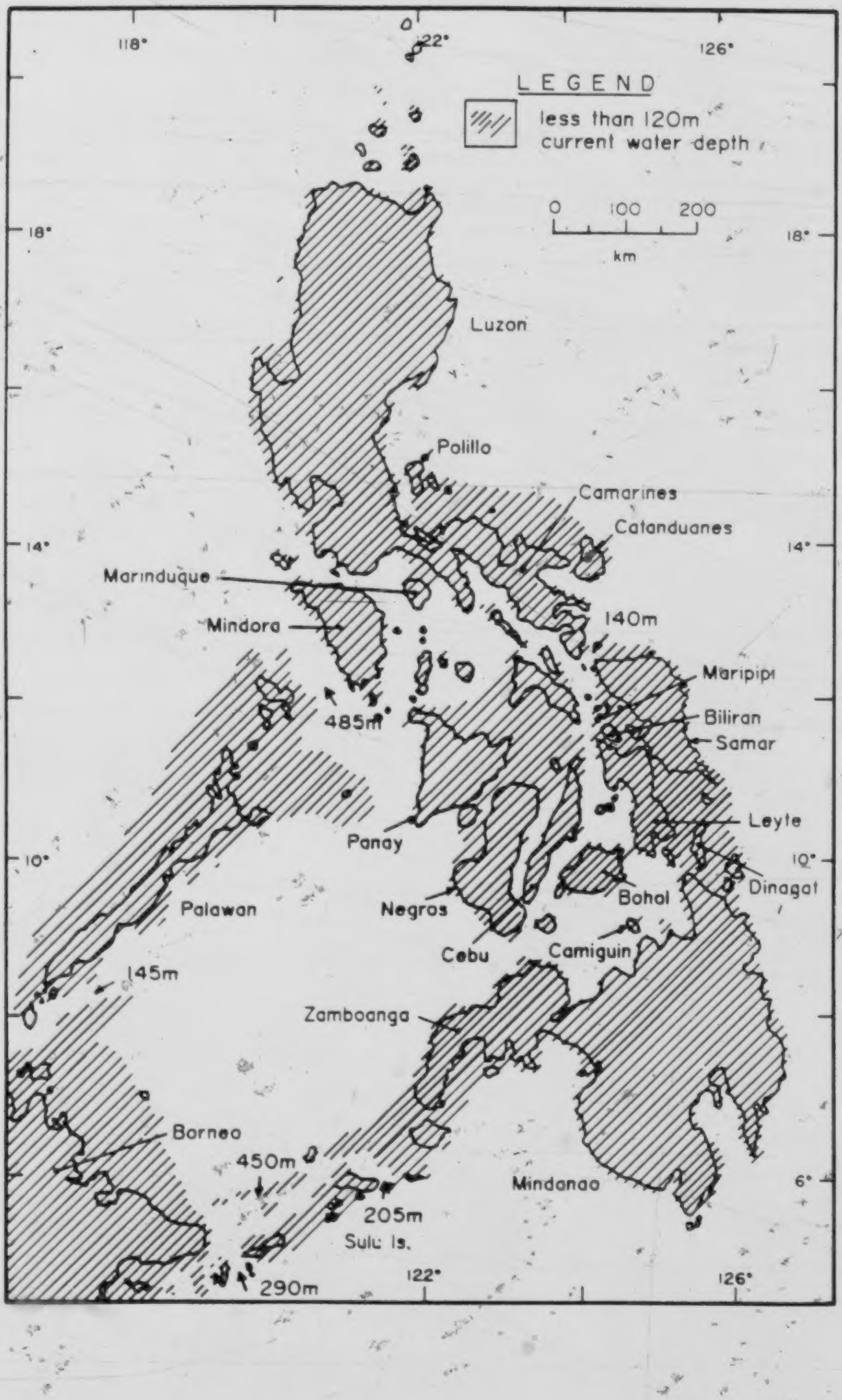
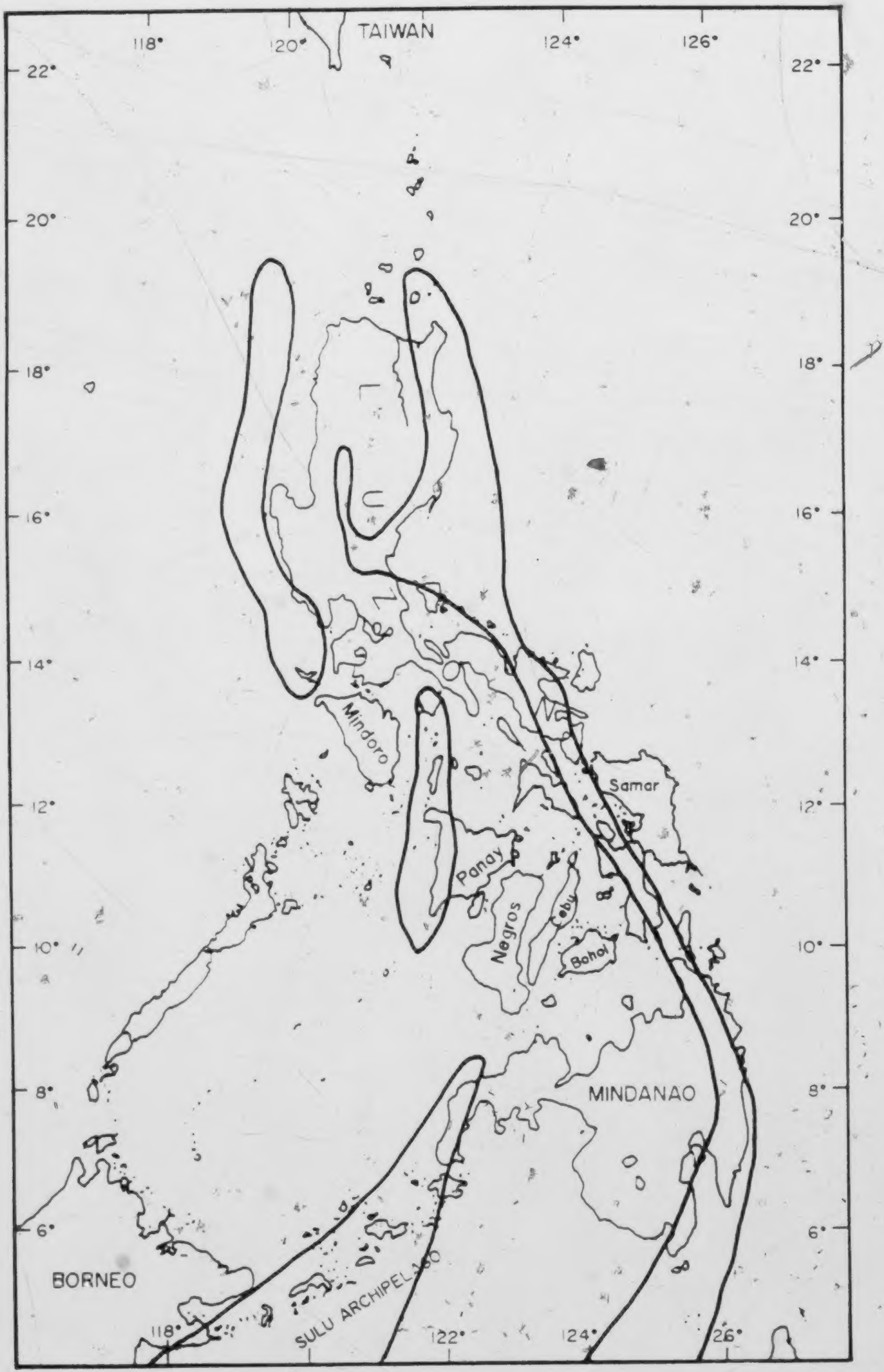

118°
122°
126°
18°
14°
10°
6°
LEGEND
less than 120m current water depth
0 100 200
km
Luzon
Polillo
Camarines
Catanduanes
Marinduque
Mindoro
140m
Maripipi
485m
Biliran
Samar
Leyte
Panay
Palawan
Negros
Bohol
Dinagat
Cebu
Camiguin
145m
Zamboanga
Borneo
450m
205m
Sulu Is.
Mindanao
290m

Fig. 117. Probable islands in the Philippine area during Vigo-Miocene time (Dickerson, 1924).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LUZON
Mindoro
Samar
Panay
Negros
Cebu
Bohol
MINDANAO
BORNEO
SULU ARCHIPELAGO
118°
122°
124°
126°

have Taiwanese species of plants with Babuyan closely allied to Luzon botanically (Merrill, 1926). Some asiatic genera of Lepidoptera such as *Pieris* , *Pyrameis* and *Argynnis* are represented in the mountains of Luzon (Diakonoff,1967) and this island has striking asian floral and avifaunal elements (Merrill,1926). Distinction, however, between the thrips faunas of Luzon and Taiwan might reflect the isolation between these two land masses. Differences in the composition of Luzon and Taiwan's faunas have been observed also by Ueno (1988) in his study of carabid beetles.

b) The Indonesian thrips fauna is distinct from that of Malaysia

Since the large islands of Indonesia (e.g. Sulawesi, Java, Sumatra) and Malaysia (e.g. Borneo, etc.) were not analyzed separately in this study due to lack of sufficient data from some of them, generalization on the faunal affinities of Indonesia, as suggested by the results of this analysis seems unwise. As shown by the distribution of carabid beetles, Java and Borneo have closely related faunas quite distinct from those of Sulawesi. According to Darlington (1971), many carabid genera that are represented in Java and Borneo and the Philippines, do not occur on Sulawesi across the Makassar Strait. Striking examples are carabids of the genus *Mormolyce* (Mormolycini), and also of the myrmecophilous Paussini, of which 27 species in eight genera have been recorded from Java but none from Sulawesi. In agreement with this observation is Holloway's (1987) findings on the distribution of members of two moth families from Sulawesi: Notodontidae and Limacodidae, which he reported to be more speciose in the Philippines than in Borneo.

1. The terebrantian fauna of Indonesia has strong affinity to those of Mindanao, Visayas, Luzon, Taiwan and Japan

The strong affinity between Indonesian and Philippines Terebrantia may result from human interference and the present distribution of plants. Javan elements may have entered the Philippines through Borneo, and Sulawesian elements through southern Mindanao. Van Balgooy (1987) reported, at both generic and specific levels, the flowering plants of Sulawesi to have stronger affinities to the north with the Philippines, than to the east with the Moluccas and to the south with the Lesser Sunda Islands. Moreover, if the elongate island mentioned above (Fig. 117) existed along the site of the present eastern Philippines during the Vigo-Miocene, that island could have served as a highway for movement of plants and animals between Sulawesi and the Philippines. Recent discoveries made by geoscientists from the Ocean Drilling Program in the Philippine seas reveal that Celebes [Sulawesi] sea was part of a larger ocean basin which began to receive volcanic debris some 20 m.y.b.p, from both Indonesian and Philippine volcanoes (Matias, 1989). This finding seems to indicate that Sulawesi was closer to the Philippines than today and that exchange of faunal elements between these islands has taken place since.

2. Malaysian thrips are allied to the terebrantian fauna of Palawan and to the tubuliferan fauna of Visayas and Mindanao

Malaysia's alliance with Palawan, Visayas and Mindanao could be attributed to direct previous land connection to these islands via Borneo (northern Borneo connected to Palawan; northeast Borneo to the Sulu archipelago) during the late middle Pleistocene (Dickerson,1924; 1928).

Zoologically and botanically, Palawan has been considered by many workers to be a northern extension of Borneo. Palawan is faunistically different from the rest of the Philippines while its similarity with Borneo and the rest of Malaysia is unmistakable (Racheli and Biondi,1988). Zoogeographic studies of mammals, birds, mollusks, amphibians, reptiles, freshwater fishes, pachyrrhynchid beetles and butterflies and moths are in reasonable accordance with each other (Semper, 1902; Merrill, 1926; Gressitt, 1961; Diakonoff, 1967). Palawan is, thus, only politically associated with the Philippines.

Visayas and Mindanao may likewise have received their Borneoan elements via Palawan and the Sulus. Bornean plants reached Mindoro and the Panay Islands of Visayas via Palawan (Merrill, 1926). Likewise, to the south, the Sulu islands have certain Borneoan elements that are absent from the main part of the Philippine archipelago, some of which extend into Zamboanga. This postulated Sulu bridge, however, was believed to be an unstable connection tbetween Borneo and the Philippines (Dickerson, 1928).

c) New Guinea has closer faunal affinity to Southeast Asia than to Australia

Based on its inadequately known thrips, New Guinea is closer faunistically to southeast Asia than to Australia. Australia's considerable difference from New Guinea is perhaps due to the duration of its isolation from the latter that must have been sufficient to produce many endemics. New Guinea's stronger faunal affinity with southeast Asia is perhaps due to the presence of "stepping stone" islands such as the Moluccas and the Lesser Sunda Islands between them. Fluctuating land bridges between these islands may have existed during periods of low water level.

Some early studies indicating a relationship between New Guinea and Southeast Asia are: Karny (1929) on Orthoptera; Lieftinck (1942, 1949 a ,b) on Odonata; Darlington (1952) on Carabidae; Diakonoff (1955) on Microlepidoptera; Marshall (1956) on celeuthine weevils; Usinger and Matsuda (1959) on Aradidae; Drake (1960) on Tingidae, Gressitt (1961) on Cerambycidae and Schuh and Stonedahl (1986) on Miridae.

Wallace's six zoogeographical regions still stand today. Only in the Pacific have some of his assumptions been considered since to be incorrect so far as insects are concerned (Gressitt,1961; Schuh and Stonedahl, 1986). Wallace included most oceanic islands in the Australian region when actually their faunas are in general more closely related to those of southeast Asia. Wallace (1876) used the distribution of higher vertebrates in constructing his regions and as Simpson (1953) suggested, barriers to mammals may not necessarily act as barriers to insects but rather as filter bridges or sweepstake routes. These differences perhaps account for the observed discrepancies between the present distributions of insects and mammals.

Darlington (1971) preferred to include New Guinea as a transitional area between the Oriental and Australian regions rather than including it in the Australian region. In his work on the distribution of carabid beetles, he found some beetles to be restricted to the western end or southern coast of New Guinea which he interpreted as recent arrivals from either the orient or from Australia.

d) The terebrantian fauna of Southeast Asia is allied to Australia and its tubuliferans to India

Since most terebrantians are either phytophagous or pollen feeders, their present distribution depends upon plant distribution which is highly influenced by man. In the Philippines, Australian plants are relatively well represented with many species of some genera reaching as far as northern Luzon (Merrill,1926). How these plants became so established in the Philippines could be due to various factors but perhaps mainly from human intervention since the Philippine islands are mainly oceanic in origin.

As for tubuliferans, the seeming remoteness of the Australian fauna is perhaps due to our poor knowledge of Australian tubuliferans (Mound and Houston,1987). Many still unknown species might be leaf feeders since the distributions of the fungal feeders such as *Nesothrips* spp. shows closer affinities with Australia (Fig. 118). Southeast Asia's affinity to India, however, might be due to the subcortical habits of many fungus feeding tubuliferans. Rafting may have been the main agent for dispersal of some of such species.

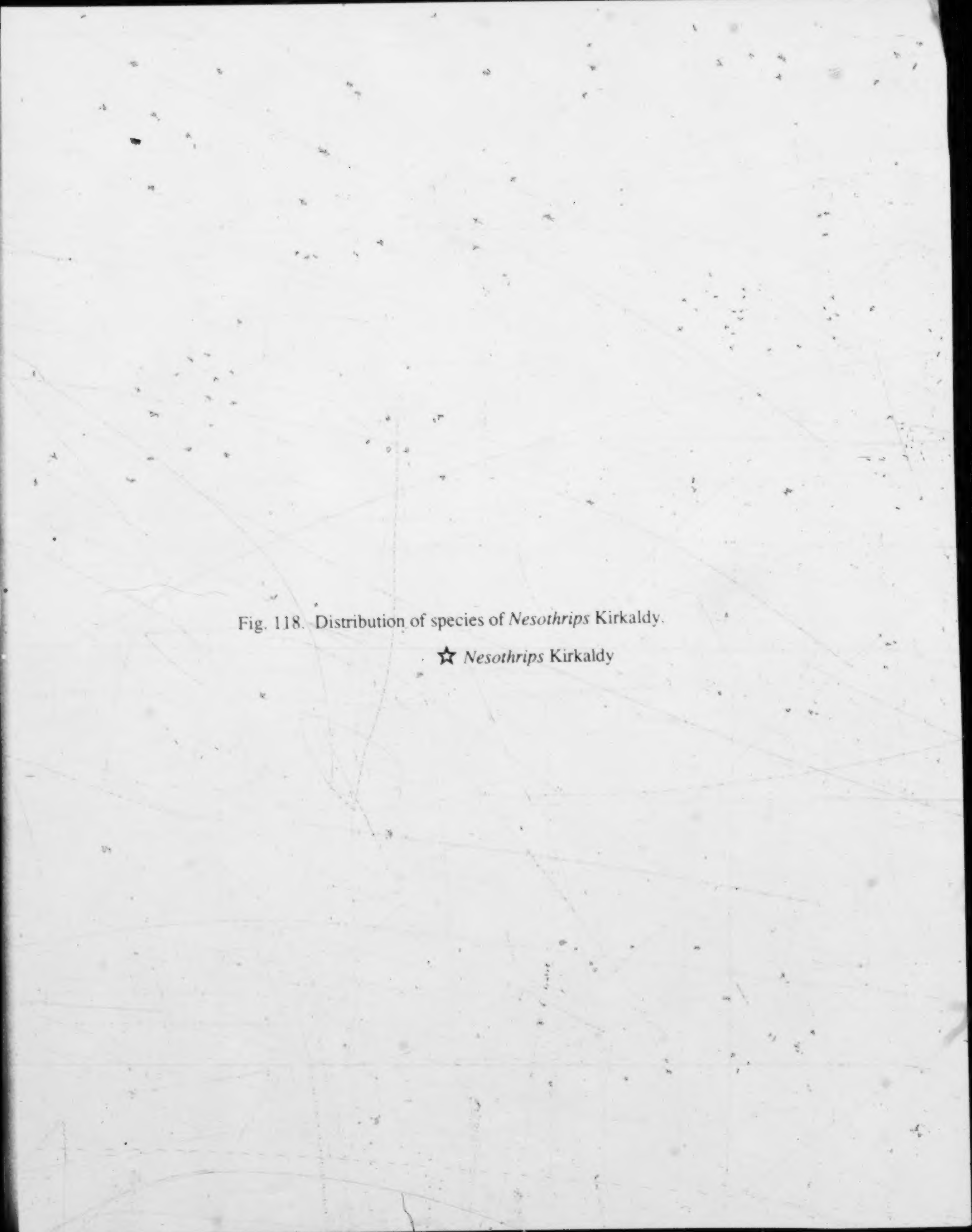
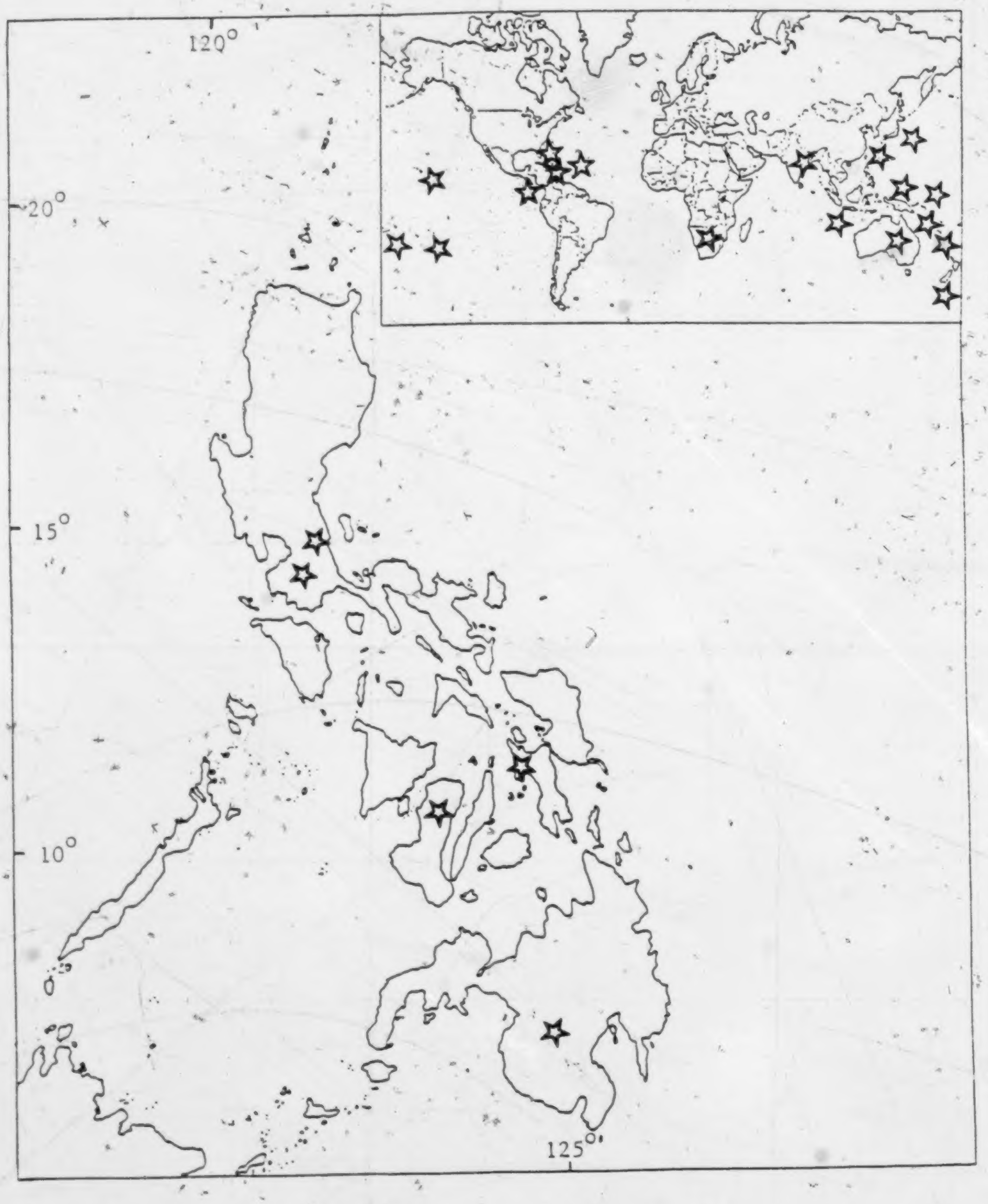


Fig. 118. Distribution of species of *Nesothrips* Kirkaldy.

☆ *Nesothrips* Kirkaldy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Dead branches of trees bearing others might have been carried by cyclonic winds to the Ocean. Representatives of certain *Dinothrips* and *Meiothrips* spp. (Fig. 119) may have been carried to various islands of southeast Asia in this way. Such dead branches could carry immatures and adults of fungivorous tubuliferans which are dispersed to and establish on various neighboring islands. Food would not be limiting for these thrips since they live under bark and are well protected from desiccation and their chance of surviving would seem especially high.

In summary, the Philippines is not a single zoogeographic unit and thrips and other insects may have entered from 4 routes: a main movement from Borneo through Palawan; a second from Borneo through the Sulu Islands; a third through Sulawesi to southern Mindanao; and a fourth from Taiwan to Northern Luzon. Palawan is distinctly Malaysian in affinity while the remainder of the Philippines is the meeting ground of 4 migratory routes. Luzon has more continental Asian elements while Visayas and Mindanao are faunistically allied.

Many terebrantians and some tubuliferans may have reached the islands at the same time as the flowering plants while fungivorous tubuliferans did so by rafting from neighboring islands particularly Borneo and Sulawesi. Man may have introduced many plant associated species, and therefore it is to be expected that the percentage of endemism in tubuliferans is higher (52.8%) than in terebrantians (26.4%) in the Philippines.

Other affinities of the Philippine thrips

Mexico has 26 genera in common with the Philippines. Many of these genera are cosmopolitan and might have reached both countries through human intervention. Striking examples are *Chirothrips mexicanus* Crawford and *Chirothrips spiniceps* Hood; common in central and south America, the Caribbean, and the southern states of North America (Fig. 120). Both are common grass feeders in the Philippines and have probably been

Fig. 119. Distribution of species of *Dinothrips* Bagnall and *Meiothrips* Priesner.

● *Dinothrips* Bagnall

★ *Meiothrips* Priesner

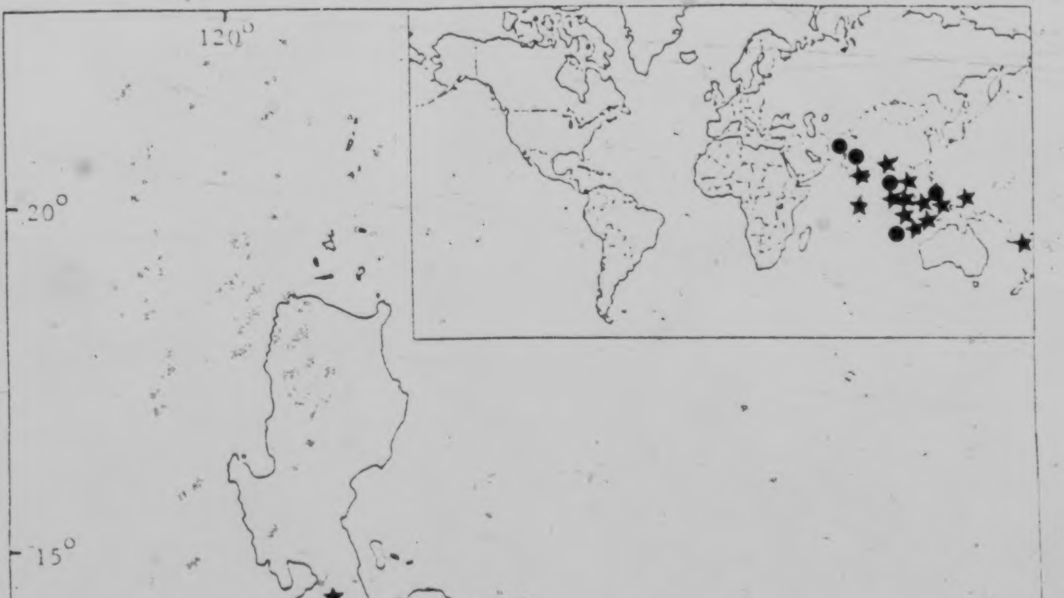
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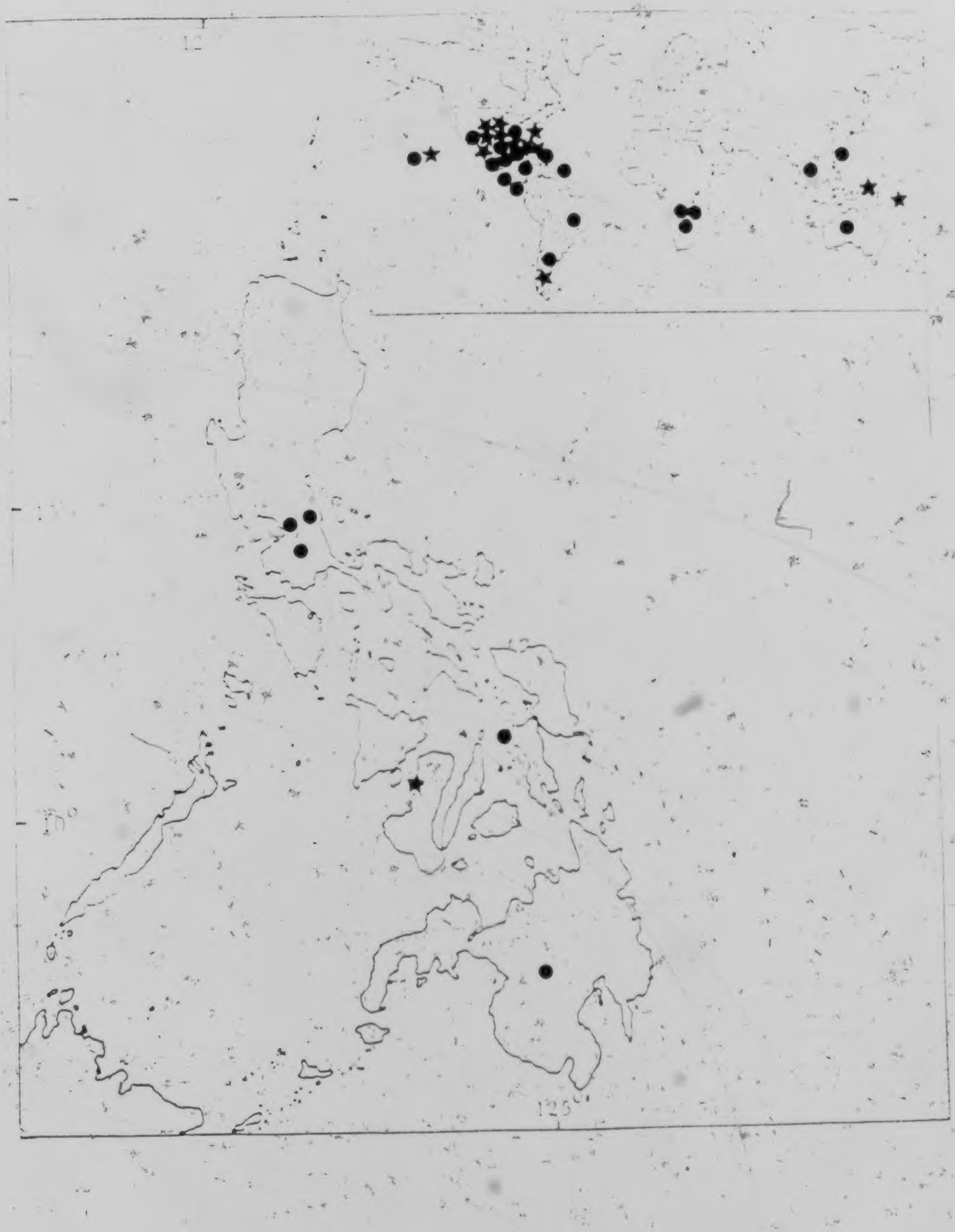
Fig. 120. Distribution of *Chirothrips mexicanus* Crawford and *Chirothrips spiniceps* Hood.

● *C. mexicanus* Hood

★ *C. spiniceps* Crawford

5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introduced from Mexico. Despite the distance, presence of Mexican elements in the Philippines is not surprising. Historically, the Philippines and Mexico were both under Spanish occupation. From 1521 to 1820, the Philippines were governed as a dependency of Mexico and for all those years, all communication between Spain and the Philippines was via Vera Cruz and Acapulco by spanish galleons (Merrill, 1926). These ships carried goods, and ornamental or medicinal plants which perhaps carried thrips with them. There are many plants in the Philippines of Aztec or Mayan origin. For example, a local name Akapulko for *Cassia alata* Linn. clearly suggests that this plant originated from Acapulco, Mexico.

Darlington (1970) noted that 2 Central American carabid species, *Clivina fasciata* and *Selenophorus pyritosus*, occur in Guam and some other Pacific Islands and similarly attributed this peculiar distribution to the fact that spanish galleons regularly stopped in Guam.

The Philippines have recieved also thrips through plant introductions from elsewhere. A good example is *Pseudodendrothrips mori* (Niwa). This thrips feeds on mulberry, *Morus alba* L. which are host plants of the commercial silkworm, *Bombyx mori*. The present distribution of this species includes China, Korea, Taiwan, Japan, the Philippines and U.S.A. (Maryland and Illinois) (Fig. 121). It is probable that interest in the silkworm industry in these countries was responsible for the present distribution of *P. mori*. This species probably originated in China with its host. In the Philippines, *P. mori* is abundant on mulberry at Los Banos, Laguna where continuing projects on silkworms are conducted by researchers in the University of the Philippines.

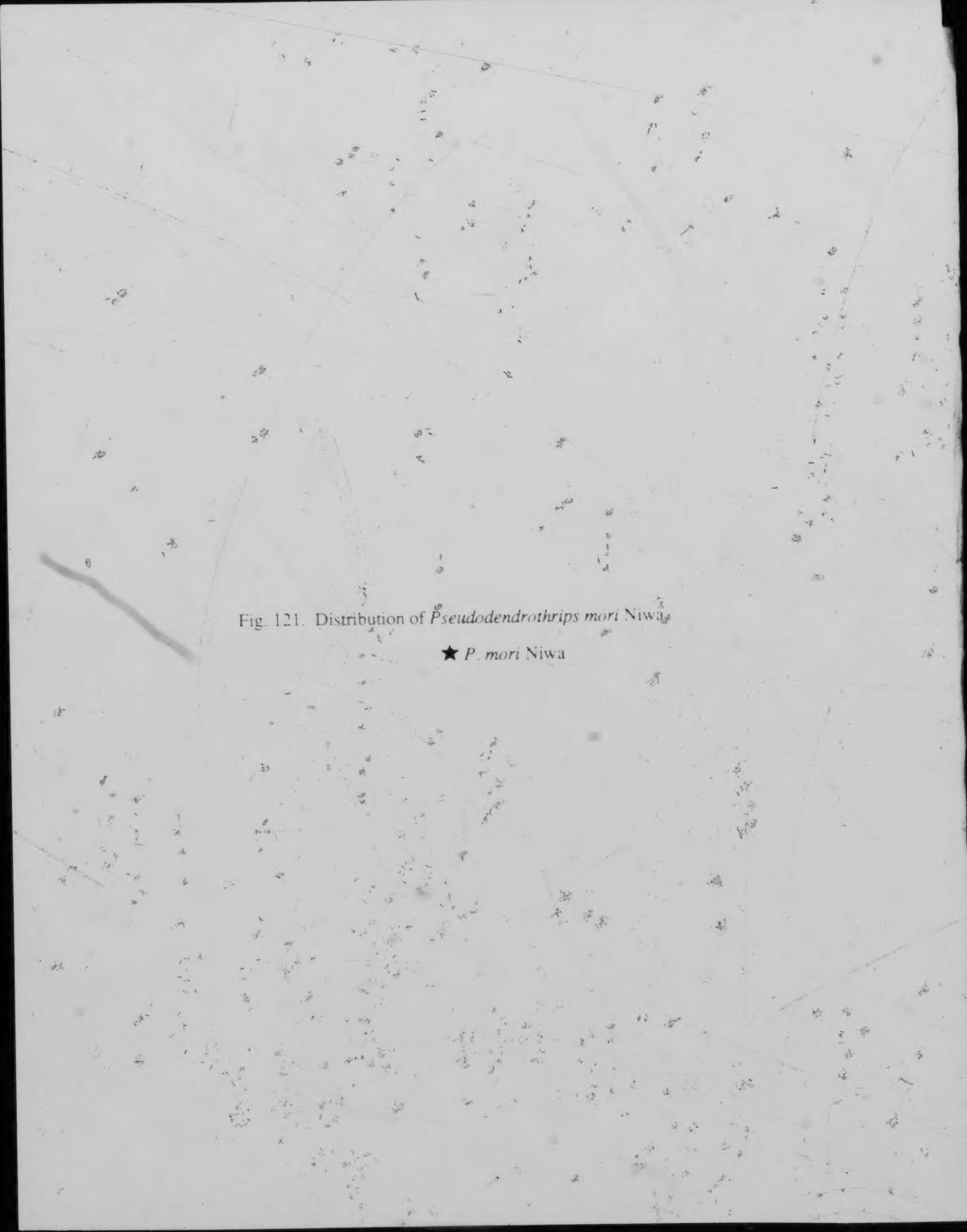
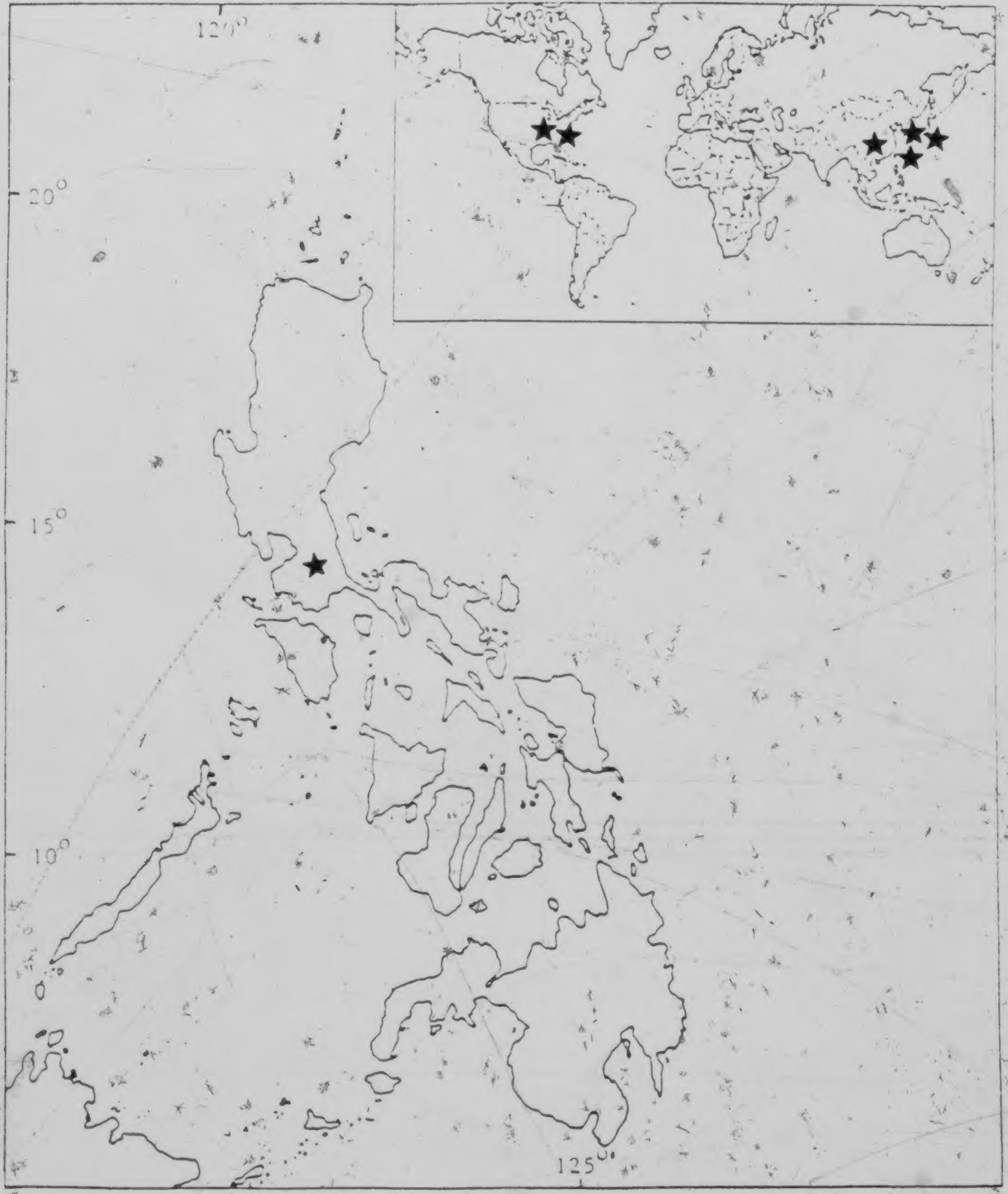


Fig. 121. Distribution of *Pseudodendrothrips mori* Niwa

★ *P. mori* Niwa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BIOGRAPHY

Cecilia P. Reyes first saw the light on February 1, 1956 in once peaceful Cotabato, Mindanao better known as the "the rice bowl of the Philippines". She came from a family of six who were originally from Iloilo, Visayas and of Malay and Hispanic ancestry. She is presently married to Stephen G. Reyes, a bee and wasps systematist, from Bacolod City.

She obtained her elementary education in New Panay Elementary School in 1968; her secondary education in Notre Dame of Mlang in 1972 and graduated with the degree of Bachelor of Science in Agriculture with a major in Entomology in 1976 from the University of Southern Mindanao (nee MIT). In all her student years, she was privileged to live a comfortable life fully supported by her parents.

In November, 1976, she was hired as a temporary Instructor at the University of Southern Mindanao and became their youngest employee at age 20. In March, 1977, she enrolled in a training course on Pesticide Ecology under the sponsorship of the Southeast Asia Ministry of Education Organization, Regional Center for Tropical Biology (SEAMEO-BIOTROP) in Bogor, Indonesia.

In October, 1977, a few months after she reached the legal age of a civil servant, she was promoted to the position of a permanent Instructor and was awarded a scholarship by the Philippine Council for Agricultural Resources Research and Development (PCARRD), to pursue graduate studies in Entomology.

In 1978, she took and passed the Professional Career Civil Service Board Examination making her eligible for all permanent, goverment jobs in her area of specialization.

In 1981, she graduated with the degree of Master of Science in Entomology with a minor in Mycology from the University of the Philippines at Los Banos. Her thesis research was on mites under the supervision of Dr. Leonila Corpuz-Raros.

In 1982, she was awarded a 4-year scholarship by the University of Southern Mindanao to pursue studies for the Ph. D. in the University of the Philippines at Los Banos. Motivated by a thirst for change and adventure, she gave up her rather secure life in the Philippines and studied at MacDonald College of McGill University in Montreal, Canada in 1983-1984 under the supervision of Dr. Keith McE. Kevan, a world authority on Orthoptera. While in Montreal, she was recipient of a McGill Major Award and a M. H. Beaty Bursary while enjoying her leave with pay and a scholarship from the Philippines. At this time, she was determined to work [illegible] the systematics of Philippine Thysanoptera for her doctoral research even though her supervisor was only willing to fund her research if she switched to grasshoppers. In 1984, she returned to the University of the Philippines at Los Banos and commenced work on thrips under the supervision of Dr. Clare R. Baltazar, a leading student of parasitoid Hymenoptera in that country. It did not take her long to realize that she needed to associate with a thrips specialist to further her research on these insects in the Philippines. Since she wished also to have some courses taken at MacDonald College credited towards her degree, she wanted to return to Canada.

In 1985, Dr. B. S. Heming, a noted thrips morphologist in the Department of Entomology, University of Alberta took an interest in her research and accepted her as his graduate student. He funded her research with his NSERC grants including her visits to the United States National Museum, California Academy of Sciences, Bernice P. Bishop Museum, The Museum of Natural History and Senckenberg Natural History Museum. She also recieved financial support from the Department of Entomology as a graduate research/teaching assistant.

In December, 1986, while a student in Edmonton, she sat for and passed the General Entomology Qualifying Examination of the American Registry of Professional Entomologists (ARPE) of the Entomological Society of America (ESA) which made her eligible for certification in ARPE in the specialty of Registry Associate.

In November, 1989, she was invited by the Department of Entomology, University of Kansas, Lawrence, Kansas, U. S. A. through Dr. Charles D. Michener, a world authority on bees, to give a seminar on her work on the systematics of Philippine thrips.

During her undergraduate and graduate years, she actively participated in various activities. She was a member of 2 and an officer of 4 student organizations including the student senate, talent club and a Greek-letter organization. She also served as secretary of the USM Alumni Association in 1981-1982. As a graduate student, she was an officer of the "U. P. Metamorphosis" from 1979-1980, and a President of the "U. P. Entomological Society" from 1984-1985. Presently, she is a member of BIOTROP Research Scientists and Trainees Union, Society of PCARRD Scholars, Association of Systematic Biologists of the Philippines, Entomological Society of America and Entomological Society of Alberta.

C. P. Reyes is also a member of the Philippine Society of Penec Sandawa and an adopted sister of the great and ancient Manobo tribe of Mindanao, a recognition she recieved after she and her 28 students successfully climbed Mt. Apo, the highest peak in the Philippines (10, 311 ft.) on December, 1980 during an insect collecting trip.